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Helmholtz-Zentrum für Ozeanforschung Kiel

RV SONNE Fahrtbericht / Cruise Report SO249

BERING – Origin and Evolution of the Bering Sea: An Integrated Geochronological, Volcanological, Petrological and Geochemical Approach

Leg 1: Dutch Harbor (U.S.A.) - Petropavlovsk-Kamchatsky (Russia)
05.06.2016 - 15.07.2016

Leg 2: Petropavlovsk-Kamchatsky (Russia) - Tomakomai (Japan)
16.07.2016 - 14.08.2016

Berichte aus dem GEOMAR
Helmholtz-Zentrum für Ozeanforschung Kiel

Nr. 30 (N. Ser.)

Oktober 2016

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Reinhard Werner, Kaj Hoernle, Folkmar Hauff,
Maxim Portnyagin, Gene Yogodzinski, Alexander Ziegler
with contributions from cruise participants

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1.1 SUMMARY

The R/V SONNE expedition SO-249 is part of the research project BERING, conducted in the framework of the Russian-German Agreement on Marine and Polar Research and in close cooperation with U.S. American colleagues. The overarching goal of BERING is to elucidate the magmatic and tectonic evolution of the Bering Sea and its margins over the past ≥50 m.y. In particular, BERING investigates the physical and chemical conditions that control the development of subduction zones, including subduction initiation, evolution of mature arc systems, and the impact of subduction volcanism on the environment. R/V SONNE cruise SO-249 BERING conducted geological, morphological, and biological studies in the in western the Aleutians, the Pacific seafloor subducting beneath the Aleutians and northern Kamchatka, and in the western Bering Sea. Besides extensive multi-beam mapping and sediment echo-sounder profiling, total of 150 dredge hauls have been conducted on the two legs of cruise SO-249. Of these, 91 delivered massive magmatic and/or metamorphic rocks, 34 volcaniclastic rocks including breccias containing lava fragments, 64 sedimentary rocks, and 19 Mn-Fe-Oxide crusts and nodules. No equipment was lost or seriously damaged. SO-249 achieved its major goals and the SO-249 sample set represents the most detailed sampling of the working areas to date. The on shore work program at Russian, German, and U.S.-American institutions includes geochronological, petrological and geochemical studies on igneous samples obtained during the cruise. The results of BERING will be integrated with those of previous campaigns (e.g. KOMEX, KALMAR), and work carried out within the World Oceans and GeoPRISMS initiatives.

The main goal of biological sampling was to survey the benthic biodiversity in the study area. In addition, fresh specimens pertaining to specific taxa (Cnidaria, Brachiopoda, Cephalopoda, Echinodermata) were collected to supplement ongoing research projects. Of the 150 dredges taken, 150 (100%) contained sediment and 112 (74.7%) contained macrofauna. In addition to the 150 sediment samples, almost 1,500 single benthic, benthopelagic, and pelagic macrofaunal organisms were obtained. The majority of the objectives of biological sampling were reached, in particular with regard to obtaining fresh tissue for immunohistochemical, genomic, and transcriptomic analysis from various brachiopod and ophiuroid species.

1.2 ZUSAMMENFASSUNG

Die FS. SONNE-Expedition SO-249 ist Teil des Forschungsprojektes BERING, das im Rahmen der wissenschaftlich-technischen Zusammenarbeit zwischen Deutschland und Russland auf dem Gebiet der Meeres- und Polarforschung sowie in enger Kooperation mit U.S.-amerikanischen Kollegen durchgeführt wird. Das übergeordnete Ziel von BERING ist die Rekonstruktion der magmatischen und tektonischen Entwicklung der Beringsee und ihrer Randbereiche während der letzten >50 Mill. Jahre. Insbesondere sollen Prozesse, die den Beginn und die Entwicklung von Subduktionssystemen kontrollieren, sowie die Auswirkungen von Subduktionsvulkanismus auf die Umwelt untersucht werden. Während der zwei Fahrtabschnitte der FS. SONNE-Reise SO-249 wurden umfangreiche geologische, morphologische und biologische Untersuchungen in der westlichen Beringsee und an den Aleuten sowie der Ozeankruste, die unter die Aleuten und Nordkamtschakta subduziert wird, durchgeführt. Neben umfangreichen Kartierungen und Sedimentecholotprofilierungen wurden während SO-249 magmatische, metamorphe und sedimentäre Strukturen mit insgesamt 150 Dredgezüge beprobt. Davon erbrachten 91 massive magmatische und / oder metamorphe Gesteine, 34 vulkaniklastische Gesteine (u.a. Brekzien die Lavafragmente enthalten), 64 Sedimentgesteine und 19 Mangankrusten oder -Knollen. Es wurde keine Ausrüstung verloren oder nennenswert beschädigt. Insgesamt hat SO-249 seine wichtigsten Ziele erreicht und der auf dieser Reise gewonnene Probensatz repräsentiert die bis heute bei weitem umfassendste Beprobung der Arbeitsgebiete. Die auf SO-249 gewonnenen Proben werden am GEOMAR und bei unseren Kooperationspartnern, petrologisch, geochemisch und geochronologisch bearbeitet. Die Ergebnisse von BERING werden in die früherer Projekte (z.B. KOMEX und KALMAR) und in die Untersuchungen der laufenden "World Oceans" und "GeoPRISMS" Programme integriert.

Das Hauptziel der biologischen Probennahme war es, die Diversität der benthischen Meio- und Makrofauna des Untersuchungsgebietes zu dokumentieren. Darüber hinaus sollte für laufende Projekte gezielt frisches Material spezifischer Taxa (Cnidaria, Brachiopoda, Cephalopoda, Echinodermata) gesammelt warden. Insgesamt konnten 150 Züge mit der Kettensackdredge durchgeführt werden, von denen 150 (100%) Sedimentproben und 112 (74,7%) Makrofauna enthielten. Zusätzlich zu den 150 Sedimentproben mit der darin befindlichen Meiofauna konnten insgesamt fast 1.500 Einzelproben benthischer, benthopelagischer und pelagischer makrofaunaler Organismen gesammelt werden. Der Großteil der gesteckten Ziele wurde erreicht, insbesondere in Bezug auf das Sammeln von für immunohistochemische, genomische und transkriptomische Analysen geeigneten Gewebeproben von Ophiuroiden und Brachiopoden.

2. PARTICIPANTS

2.1. SHIP'S CREW

Meyer, Oliver	Master	Schüler, Achim	Chief Engin.
Soßna, Yves-M.	Chief Mate	Schwieger, Philipp	2nd Engineer
Büchele, Ulrich	2nd Mate	Horsel, Roman	2nd Engineer
Göbel, Jens	2nd Mate	Bredlo, Björn	Motorman
Leppin, Jörg	Chief Electronician	Talpai, Matyas	Motorman
Großmann, Matthias	Electronician	Hoffmann, Georg	Motorman
Borchert, Wolfgang	System Operator	Blohm, Volker	Fitter
Meinecke, Stefan	System Operator	Schmidt, Hendrik	Electrician
Heuser, Sabine	Surgeon	Beyer, Thomas	Electrician
Tiemann, Frank	Chief Cook	Lemm, René	Chief Steward
Garnitz, Andre	2nd Cook	Hellenbrandt, Katharina	Stewardess
Kraft, Jürgen	Boatswain	Stöcker, Frank	Steward
Stängl, Günther	A.B.	Steep, Maik	Steward
Fricke, Ingo	A.B.	Eidam, Oliver	A.B.
Ernst, Arnold	A.B.	Ross, Reno	A.B.
Heibeck, Frank	A.B.	Fischer, Sascha	A.B.

Participation only in Leg 2:

Adam, Patrick	Practical trainee	Seltz, Christian	Electrician
Arriens, Christian	Practical trainee	Werum, Josua	Practical trainee

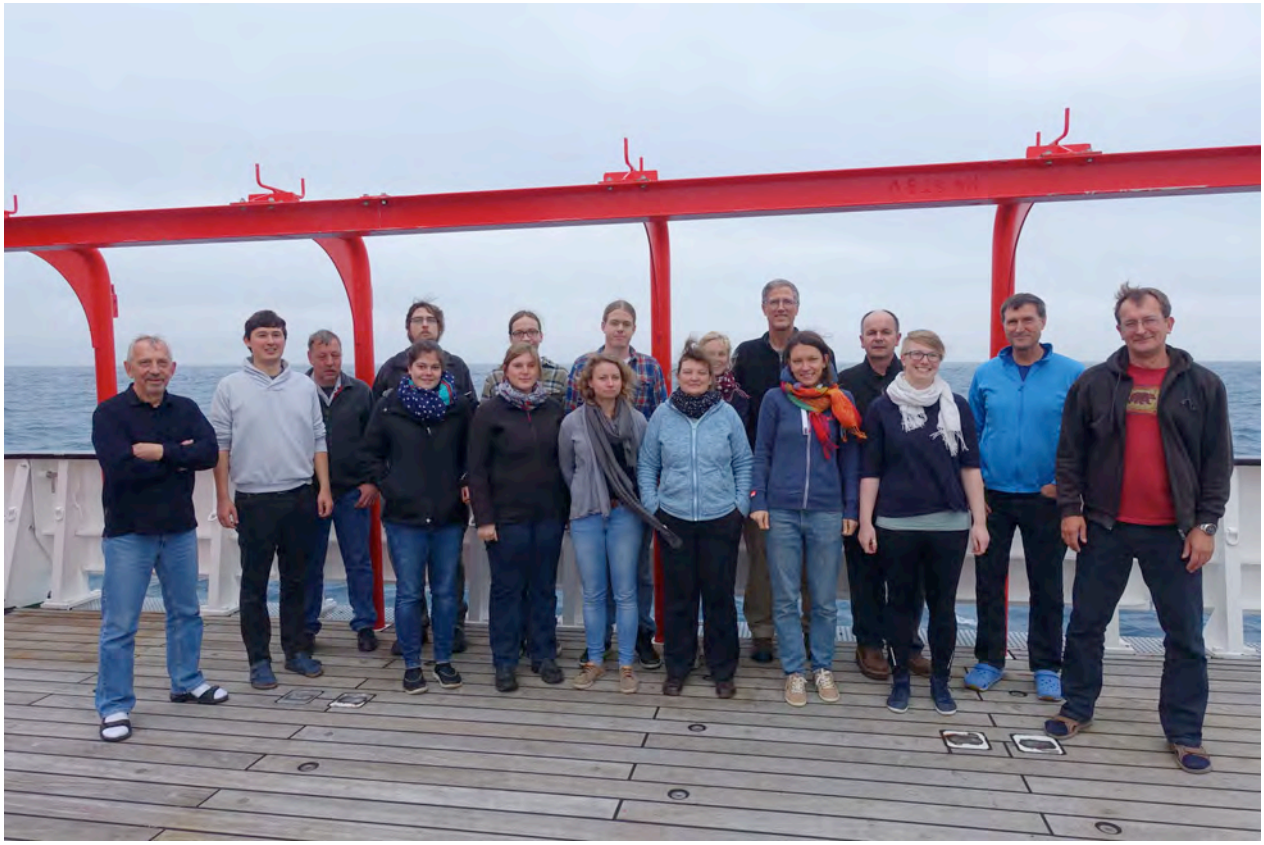
2.2. PRINCIPAL INVESTIGATORS FOR SO-249 BERING *(in alphabetical order)*

Baranov, Boris	IO RAS
Hauff, Folkmar	GEOMAR
Hoernle, Kaj	GEOMAR (Project Coordinator)
Lüter, Carsten	MfN
Portnyagin, Maxim	GEOMAR
Werner, Reinhard	GEOMAR
Yogodzinski, Gene	USC

2.3. SHIPBOARD SCIENTIFIC PARTY

Leg 1 *(in alphabetical order)*:

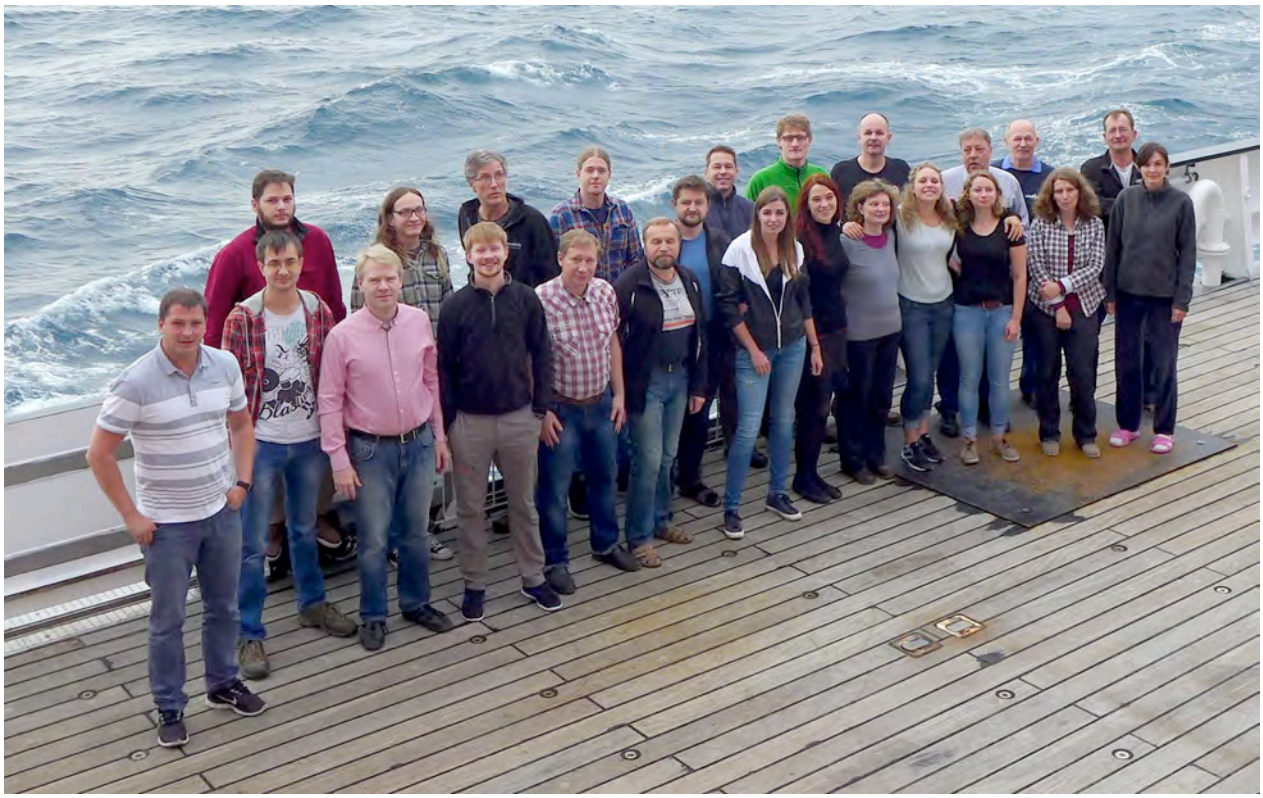
1.	Hauff, Folkmar	Senior Scientist	GEOMAR
2.	Hauff, Silke	Technician	GEOMAR
1.	Hoernle, Kaj	Chief Scientist	GEOMAR
2.	Jensen, Owen	Student	USC
3.	Koch, Steffen	Student	GEOMAR
4.	Krasnova, Elizaveta	Senior Scientist	GEOKHI RAS
5.	Portnyagin, Maxim	Senior Scientist	GEOMAR
6.	Rahmsdorf, Charlotte	Student	GEOMAR
7.	Schönhofen, Milena	Student	GEOMAR
8.	Siebelist, Marlena	Student	GEOMAR
9.	Siegrist, Max	Student	USC
10.	Silantiev, Sergey	Senior Scientist	GEOKHI RAS
11.	Steffen, Ilona	Student	GEOMAR
12.	Waldmann, Ryan	Student	USC
13.	Wellschmidt, Gesine	Student	GEOMAR
14.	Werner, Reinhard	Senior Scientist	GEOMAR
15.	Yogodzinski, Gene	Senior Scientist	USC
16.	Ziegler, Alexander	Senior Scientist (Biology)	Univ. Bonn



The SO-249 Leg 1 Shipboard Scientific Party (photo: Jens Göbel).

Leg 2 *(in alphabetical order)*:

1. Baranov, Boris	Co-Chief Scientist	IO RAS
2. Bocharnikov, Roman	Senior Scientist	Univ. Hannover
3. Davydova, Mariia	Senior Scientist	FEGI FEB RAS
4. Ferdorchenko, Pavel	Observer	FSB
5. Gorbach, Natalia	Senior Scientist	IVS FEB RAS
6. Hauff, Folkmar	Senior Scientist	GEOMAR
7. Hauff, Silke	Technician	GEOMAR
8. Huttenlocher, Lisa	Student	GEOMAR
9. Jensen, Owen	Student	USC
10. Krasheninnikov, Stepan	Senior Scientist	GEOKHI RAS
11. Ladwig, Amrei	Student	GEOMAR
12. Mironov, Nikita	Senior Scientist	GEOKHI RAS
13. Nazarova, Daria	Student	GEOKHI RAS
14. Ostapenko, Dmitrii	Student	FEGI FEB RAS
15. Portnyagin, Maxim	Senior Scientist	GEOMAR
16. Rahmsdorf, Charlotte	Student	GEOMAR
17. Savelyev, Dmitry	Senior Scientist	IVS FEB RAS
18. Siegrist, Max	Student	USC
19. Stepanov, Oleg	Student	Univ. Moscow
20. Treff, Florian	Student	GEOMAR
21. Tsukanov, Nukolay	Senior Scientist	IO RAS
22. Werner, Reinhard	Chief Scientist	GEOMAR
23. Yogodzinski, Gene	Senior Scientist	USC
24. Ziegler, Alexander	Senior Scientist (Biology)	Univ. Bonn



The SO-249 Leg 2Shipboard Scientific Party (photo: Arnold Ernst).

2.4. INSTITUTIONS

FEGI FEB RAS	Geolological Institute of the Russian Academy of Sciences, Vladivostok, Russia
FSB	Federal Security Service of the Russian Federation, Petropavlovsk-Kamchatsky, Russia
GEOKHI RAS	Vernadsky Institute of the Russian Academy of Sciences, Moscow, Russia
GEOMAR	Helmholtz-Zentrum für Ozeanforschung Kiel, Germany
IO RAS	P.P. Shirshov Institute of Oceanology of the Russian Academy of Sciences, Moscow, Russia
IVS FEB RAS	Institute of Volcanology and Seismology of the Russian Academy of Sciences, Petropavlovsk-Kamchatsky, Russia
MfN	Museum für Naturkunde an der Humboldt-Universität zu Berlin, Berlin, Germany
Univ. Bonn	Institut für Evolutionsbiologie und Ökologie, Rheinische Friedrich-Wilhelms-Universität Bonn, Germany
Univ. Hannover	Institut für Mineralogie, Leibniz Universität Hannover, Hannover, Germany
Univ. Moscow	Moscow State University (Lomonossow University), Moscow, Russia
USC	University of South Carolina, Columbia, U.S.A.

3. NARRATIVE OF THE CRUISE

(K. Hoernle, R. Werner, A. Ziegler)

After a long journey from Germany halfway around the world to Dutch Harbor, Alaska, the German and Russian scientists met up with their American colleagues on June 4. On the next day the scientists boarded R/V SONNE, unpacked the sampling equipment and set up the laboratories. At 9:00 a.m. on June 6, R/V SONNE left Dutch Harbor (Figs. 3.1. and 3.2).

Fig. 3.1: During departure, a curious, young bald eagle visited the R/V SONNE. (photo: Alexander Ziegler)

Fig. 3.2: One of the many humpback whales that escorted the R/V SONNE out of Dutch Harbor. (photo: Gene Yogodzinski)

After a day of transit, we reached our study area and began dredging on the Amlia Fault (Fracture) Zone that extends southward along the Pacific Plate south of the Central Aleutians. Here we recovered an interesting variety of rocks from a fault-bounded block in the fracture zone. On the third day of the cruise, we sampled fresh basaltic rocks from the Pacific Plate along a fault running parallel to the Aleutian deep-sea trench. We then dredged Adams Seamount being located directly outboard of the Aleutian deep-sea trench. On June 10, R/V SONNE crossed the Aleutian trench once again and we carried out several successful dredges on the lower slopes of the subduction-zone forearc and the deepest parts of the walls of Adak and Amchitka Canyons at the southern side of the Aleutian Arc (Figs. 3.3 and 3.4). The samples included a wide variety of rocks typical for arc volcanoes. On board R/V SONNE, we skipped the next Monday after crossing the 180° meridian. On board, however, we used UTC (Coordinated Universal or Greenwich Time), so the missing day does not show up in any of the cruise-related reports.

On June 13, R/V SONNE left Amchitka Canyon and crossed the Aleutian deep-sea trench onto the Pacific Plate where we attempted to sample three seamounts south of the trench but recovered magmatic rocks only at one of them. On June 14, we reached the Rat Fracture Zone, oriented north-south and thus perpendicular to the trench. Four dredges along the Rat Fracture Zone brought up a variety of volcanic (basalts and volcaniclastic rocks) and plutonic (diorites) rocks. On June 16, we crossed the trench again and began dredging in Murray Canyon, located southwest of Kiska Island. We conducted eight dredge hauls in that area, six of them were carried out along the base of the western, northern and southern canyon walls. A wide variety of volcanic rocks, dioritic to gabbroic intrusive rocks, and a variety of sedimentary rocks were recovered with many very fresh samples. Unfortunately our deepest dredge track thus far at the base of the forearc slope, just above the sediment fill in the trench, brought up one-third of a dredge with consolidated mud.

An important goal of the two SO-249 cruise legs was to determine if the Aleutian Volcanic Front can be traced continuously from the Ingenstrem Trough, west of Buldir Island (US), to Piip Volcano, north of Bering Island (Russia) in the westernmost Aleutians. From June 19 to June 20, we added to previous mapping looking for young submarine volcanic centers west of the Ingenstrem Trough, but found no new centers until we approached the Western Cones Region, which was discovered on the SO-201/1b KALMAR Expedition. There we found several new

cones aligned in a perfect linear array along a young fault cutting the uppermost sedimentary sequence and recovered largely rhyodacites. R/V SONNE then proceeded southwards to the Kresta Ridge, which is a steep fault scarp bounding the northern side of a deep graben with a relief of up to 1.7 km. The fault appears to be an extension of the Bering Fault system that forms the northern margin of the plateau on which the Komandorksy Islands (Bering and Medny) are located. Here we carried out three successful dredges recovering volcaniclastic rocks, a variety of lavas, and gabbroic rocks cut by small basaltic dikes.

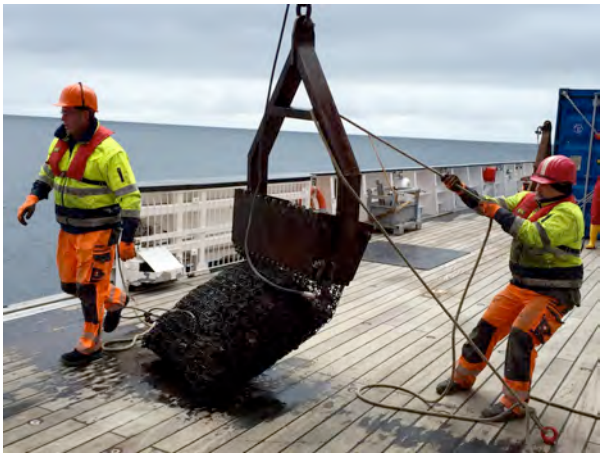


Fig. 3.3: Seamen of the R/V SONNE maneuver a full dredge from the base of Adak Canyon onto the ship's deck. (photo Kaj Hoernle)

Fig. 3.4: Despite the hard work, the scientists were in very good spirits. (photo: Kaj Hoernle)

On June 21, we returned to the Aleutian forearc and carried out several deep dredges to depths of up to 6.7 km (Fig. 3.5), largely recovering volcaniclastic material and sedimentary rocks. We then crossed the trench to the northwestern tip of the Stalemate Fracture Zone and mapped a large fault block that had been previously sampled at its southern end during the SO-201/1b cruise. On the previous SONNE cruise, dunitic rocks (primarily consisting of >90% olivine) were recovered and were interpreted to have been previously exposed to subaerial conditions, based on their alteration style. The proposed large-scale vertical tectonic movements of “several thousand meters” were met with much skepticism. Subaerial exposure, however, has now been confirmed, as will become evident below. Our first dredge on June 23 contained a wide array of rocks ranging from ultramafic samples (olivine orthopyroxenites to harzburgites) to plutonic rocks (gabbros, diorites and possibly plagiogranites) to basaltic volcanic rocks. These rocks, present in a single dredge, represent a cross section through the entire ocean crust into the uppermost mantle, providing invaluable information about the composition of the entire crustal and upper mantle input into the subduction zone (Fig. 3.6). A dredge from the top of the tectonic block was even more exciting than the first dredge. Although we expected to sample pillow basalts, representing the uppermost portion of the ocean crust, we again recovered the complete section through the ocean crust and upper mantle, with many of the rocks being rounded river/beach cobbles and coarse-grained sandstones of the major rock types in the dredge. The cobbles and sandstones provided direct confirmation that this block had indeed undergone major tectonic uplift, such that even lower crustal and upper mantle rocks were emergent and formed, at some point in their history, part of an island. After carrying out more dredging in the forearc of the Aleutian subduction zone on June 24 - 25, R/V SONNE again crossed over to the Pacific Plate and mapped the remaining portion of the Stalemate Fracture Zone and began dredging again late in day on June 26. The long mapping exercise provided the first day off for most scientists since the beginning of the cruise and allowed a shift rotation, but also provided an excellent opportunity for the midway party, enjoyed by both crew and scientists.

The fourth week of the cruise focused on the northwest Pacific Plate. We continued our multi-beam mapping of the seafloor and carried out 24 dredge hauls. We spent June 27 - 28 sampling the southeast portion of the Stalemate Fracture Zone. The dredges brought up primarily basaltic rocks. These included both pillows, some with glassy rinds, and subvolcanic rocks. Dioritic to gabbroic rocks and a variety of sedimentary rocks were also recovered. Thereafter we proceeded to a seamount province between the Stalemate FZ and the Emperor Seamounts.

Nothing was known about this fairly dense province of large seamounts before SO-249, which in contrast to the nearby Emperor Seamounts, don't appear to form part of a hotspot track, but are randomly distributed and include conical-shaped and ridge-like structures. We successfully sampled three seamounts, recovering basaltic rocks and a hyloclastite sample, which may contain fresh glass. From June 30 on, we have mapped and sampled the Detroit, Hanzei and Suizei Seamounts, which belong to the Emperor Seamount Chain. Although sampling was extremely difficult due to the thick (up to 20 cm) manganese pavement on these Cretaceous seamounts, we recovered the first ever samples from Hanzei Seamount as well as basalts from the eastern and western flanks of Suizei Seamount.

Fig. 3.5: Work on board never stops. At 1:30 a.m., the night shift attentively waits while one of the scientists washes the mud from the dredge overboard, so that they can get at the rocks. (photo Kaj Hoernle)

Fig. 3.6: Scientists excited about recovering an entire cross section from the upper mantle (foreground) through the lower crust (middle) to the top of the ocean crust (background) from the Stalemate Fracture Zone. (photo: Kaj Hoernle)

The fifth and final full week of SO-249 Leg 1 focused on mapping and sampling of the northwest Pacific Plate subducting beneath the Kamchatka Volcanic Arc. From July 4 - 6, we continued mapping and carried out six dredge hauls on the large Tenji Seamount Complex. Late in the evening on July 6, we reached the Krusenstern Fracture Zone and recovered pillow basalts and possibly some fresh glass from the upper Pacific ocean crust at several locations. On July 9 - 10, we mapped and sampled the seafloor south of the Krusenstern Fracture Zone. This work continued through Tuesday July 12, which marked the end of our work program on SO-249 Leg 1. We completed 98 dredge hauls of which 77 (=79%) yielded volcanic, plutonic, ultramafic and/or sedimentary rocks.

On July 13, we crossed into the Russian Exclusive Economic Zone (EEZ) and R/V SONNE arrived in Petropavlovsk-Kamchatsky, the capital of the Russian region of Kamchatka, early in the morning of July 14 (Figs. 3.7 and 3.8). This was the first stay of the new R/V SONNE in Russia, and - according to our knowledge - the first port call ever of a German research vessel in Petropavlovsk. During the following days in the harbor, nine SO-249 Leg 1 scientists left the vessel for their return trip home, and 15 new, primarily Russian colleagues came on board. In addition, two groups of scientists of the Russian Institute for Volcanology and Seismology in Petropavlovsk visited R/V SONNE and attended crew- and scientist-led tours that were met with great interest. Finally, apart from the usual harbor operations, crew and scientists of the ship took part in an excursion organized by our Russian colleagues to Termalny, a village known for its hot springs.

On July 17, R/V SONNE left Petropavlovsk and continued its scientific cruise heading north to the working areas near the Komandorsky Islands and at the Chukotka-Beringian continental margin at 60° - 62°N. Our first two dredges were carried out on a tectonic structure south of the Komandorsky bloc, a formation on which the western-most islands (Medny and Bering) of the Aleutian chain are located. Two previous dredges, made at this feature on the KALMAR expedition SO-201-2, yielded sedimentary rocks. Therefore we presumed at that time, that it represents a fragment of the Komandorsky forearc and not an accreted fragment of oceanic

crust as originally postulated. This interpretation seems to have been confirmed by two SO-249 dredges which also recovered exclusively sedimentary rocks.

Fig. 3.7: R/V SONNE on its way to the pier in the port of Petropavlovsk. The cranes were produced in the ex-GDR. The pier is dotted with bags that contain mining products. (photo: Gesine Wellschmidt)

Fig. 3.8: A Russian tugboat is pushing R/V SONNE gently towards the pier. (photo: Alexander Ziegler)

Afterwards R/V SONNE sailed to the Chukotka-Beringian continental margin, where we arrived in the afternoon of June 21. The nature of the northern section of the Chukotka-Beringian margin was completely unknown prior to the SO-249 cruise. SO-249 Leg 2 mapping showed that the slope of the northern Beringian margin is heavily fissured and cut by deep canyons. Its morphology indicates that at least the upper units of the margin are formed by sediment. Three dredges yielding solidified sediment confirmed this observation. Following these dredges we mapped the slope at the junction of the Beringian and Chukotka margins. The satellite-derived (predicted) bathymetry shows seamounts and steep slopes in this area but SO-249 multi-beam mapping revealed that the normally reliable predicted bathymetry failed in this case and that seamounts and steep slopes do not exist in the area. Therefore R/V SONNE headed to the southwest to the southern section of the Chukotka margin. Here, the ocean floor is characterized by NW-SE striking faults which appear to be quite young. These faults provide important information on tectonic processes and may be related to right lateral strike-slip fault at the boundary of the Beringia and North American Plate. Therefore we decided first to conduct comprehensive mapping in this area to be followed by sampling at the most appropriate sites. The dredges at the steep fault scarps, however, yielded apart from a conglomerate containing lava clasts only siltstones and sandstones.

En route to the Beta Rise in the western part of the Komandorsky Basin, we took four dredges on some dome-shaped features located at the western flank of Shirshov Ridge. Previous studies, among them those conducted on KALMAR expedition SO-201-2, indicated that an ophiolite complex may exist in this part of the ridge. SO-249 Leg 2 sampling in this area was very successful (Figs. 3.9 and 3.10) and recovered a variety of rocks types including harzburgites, dunites, orthopyroxenites, basalts, dolerites, and partially amphibolitized gabbros. This rock suite not only confirms the observations made on SO-201-2 but also makes it possible to gain new insights in the enigmatic nature and evolution of the Shirshov Ridge and so to the geodynamic history of the Bering Sea.

On July 26, R/V SONNE approached the area north of the Beta Rise (Fig. 3.11), which is characterized by a distinct heat flow anomaly. Our studies in this area aimed to test the idea that this anomaly may be associated with recent volcanism. It appears, however, that this is not the case or that if there has been volcanism, its extent has been limited. Apart from the few already known bathymetric highs, we discovered three additional features, all relatively small, up to only 500 m high. It is unclear if these represent young volcanic edifices or tectonic structures. Our dredge recovered basalt fragments from one of these structures. Geochemical analyses and age dating of these rocks may help to clarify the origin of these features.

Fig. 3.9: A full dredge promises a lot of work but is also a big success in most cases.

Fig. 3.10: Scientists collect samples from the dredge while they are observed by an interested audience.

Fig. 3.11: R/V SONNE off the coast of Kamchatka, where we experienced that the weather in the Bering Sea can also be very nice.

(photos: Stepan Krasheninnikov)

On July 28, we sailed along the Alpha fracture zone to the Volcanologists Massif, on which Piip volcano, the westernmost active volcano of the Aleutian Arc, is located. This complex represents a key area for the reconstruction of temporal and geochemical variation of the magmatism along the Aleutian Arc and of magmatic processes in an area of highly oblique subduction. The Volcanologists Massif and Piip were studied during various Russian expeditions and on SO-201-2. However, major sections of this large complex have yet not been mapped at high resolution or sampled for geochemical studies. SO-249 mapping and sampling focused on a tilted block northwest of the Volcanologists Massif, its largely unstudied eastern base and the upper portions of Piip, which appear to be three, coalesced cones. The combined bathymetric surveys of SO-201-2 and SO-249 Leg 2 have produced the first high-resolution map of the Volcanologists Massif including Piip, which provides important information about the tectonic and volcanic structures of this complex. Dredges conducted on the upper slopes of Piip delivered mainly andesitic lava and large quantities of dacitic pumice. At the Volcanologists Massif we dredged a wide variety of rock types, dominated by pillow lava showing frequently fresh glassy margins.

From August 1 - 6, our studies focused on the southwestern margin of the Bering Sea and there mainly on the Komandorsky Block. This more than 400 km long and up to 110 km wide structure forms the submarine base of the two Russian Aleutian Islands Bering and Medny. Before we started our investigations at the Komandorsky Block, we studied a chain of small enigmatic structures that emanate from the Volcanologists Massif in southeastern direction. Old maps based on single beam echo-sounding data show these features as nearly cone-like edifices. Therefore we hoped to discover a chain of young volcanic cones which may be the missing link between Piip Volcano and the further to the east located "Western Cones", which represent the westernmost recent volcanic structures in the US-part of the Aleutians. SO-249 Leg 2 multi-beam mapping, however, revealed that these structures are tiled blocs with a very smooth morphology. Nevertheless we made two dredge attempts at these features which returned besides a few lava fragments mainly semi-consolidated mud. Now it is almost certain that Piip is the only recent volcano in the Russian section of the Aleutian Arc since we also did not discover any young volcanic structures in the area to the west of Piip Volcano.

Our studies of the Komandorsky Block proceeded very successful. The dredge hauls at its southeastern flanks yielded a large amount of volcanic rocks besides sedimentary rocks which obviously form the lower portions of the slopes in this part of the block. Andesites dominate along the volcanics. At its northeastern flank we mainly dredged partly metamorphized and tectonized diorites and gabbros. At the northwestern tip of the Kommandorsky Block the dredges delivered a particular broad variety of basalts and andesites including highly hornblende-phyric

spessartites) and maybe also Adak-type high-Mg andesites (adakites). Furthermore the dredges contained metamorphically overprinted volcanics, iginmbritic rocks, tuffs and other volcaniclastic rocks. In the early morning of August 7, we finished the SO-249 Leg 2 station work and data recording as scheduled.

Fig 3.12: The coast of the Russian peninsula Kamchatka. The large volcanoes as, for example, Mutnowski (in theory on the left hand side of the picture), are hidden by the clouds (photo: Reinhard Werner).

Fig. 3.13: View of Petropavlovsk-Kamchatsky with the 3,456 m high Koriaksky volcano in the background (photo: Reinhard Werner).

Fig. 3.14: The port of Tomakomai upon arrival of R/V SONNE at the end of SO-249 Leg 2 expedition (photo: Reinhard Werner).

The last week of the cruise was characterized by the transit to our final destination Tomakomai on Hokkaido (Japan). En route we entered again the port of Petropavlovsk-Kamchatsky (Figs. 3.12 and 3.13), where we said good by to most of our Russian colleagues. On the next day, R/V SONNE headed towards Tomakomai. In order to avoid an upcoming typhoon, we had to cross the Kurile Island Arc and sailed into the Sea of Ochotsk. Among others, the transit was used for preliminary studies of the data and samples as well as for cleaning, maintenance, and packing of our equipment. On Saturday, August 13 we finally reached the port of Tomakomai according to schedule at 08:00 am (Fig. 3.14).

Complementing extensive multi-beam mapping and sediment echo-sounding, a total of 150 dredge hauls have been conducted on cruise SO-249. Of these, 91 delivered massive magmatic and/or metamorphic rocks, 34 volcaniclastic rocks including breccias containing lava fragments, 64 sedimentary rocks, and 19 Mn-Fe-Oxide crusts and nodules. No equipment was lost or seriously damaged. In summary, SO-249 achieved its major goals, i.e. bathymetric mapping and representative hard rock sampling of the southern and western margins of the Bering Sea, formed by the Aleutian Subduction Zone and Chukotka-Beringian continental margin respectively, and the northwestern Pacific seafloor, being subducted beneath the Aleutian and Kamchatka arcs. The SO-249 sample set represents the most detailed sampling of the working areas to date. The biological sampling during SO-249 was unusually successful and will result in many months of further analysis, in particular with regard to obtaining fresh tissue for immunohistochemical, genomic, and transcriptomic analysis from various brachiopod and ophiuroid species. Of the 150 dredges taken, 150 (100%) contained sediment and 112 (74.7%) contained macrofauna. In addition to the 150 sediment samples, almost 1,500 single benthic, benthopelagic, and pelagic macrofaunal organisms were obtained. All macrofaunal specimens

collected during SO-249 will be transferred to the Museum für Naturkunde (Berlin, Germany), where they will be re-assessed and then distributed to colleagues for species identification.

Figure 3.15 shows an overview of the sampling stations and the ship´s tracks of R/V SONNE cruises SO-249 Leg 1 and 2. For more detailed maps see chapter 7.

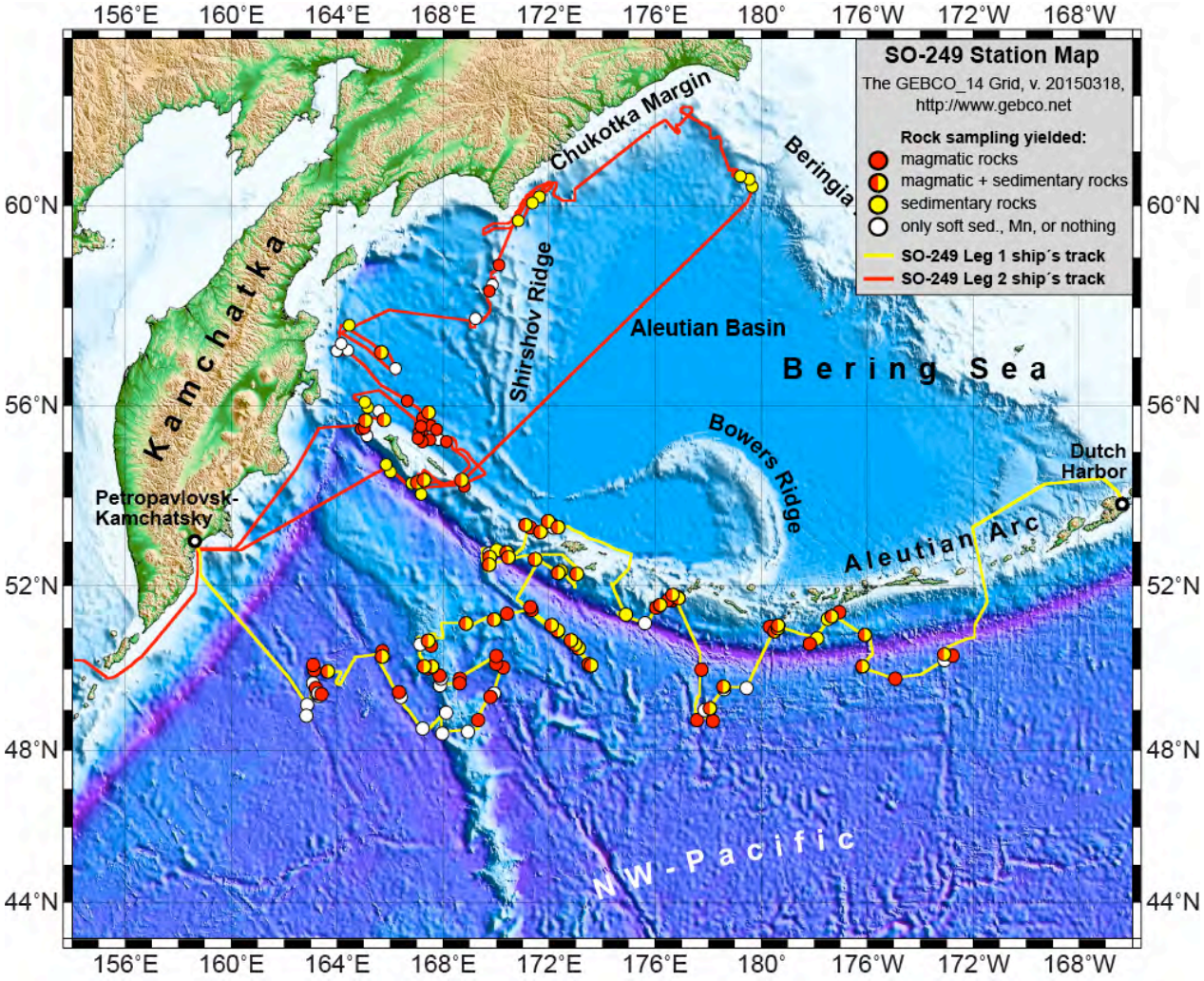


Fig. 3.15: Ship´s tracks and sampling stations (colored dots) of R/V SONNE cruises SO-249 Leg 1 and 2 (data base for bathymetry: The GEBCO_2014 Grid, version 20150318, http://www.gebco.net).

4. AIMS OF THE CRUISE

(K. Hoernle, A. Ziegler, M. Portnyagin, B. Baranov, G. Yogodzinski, R. Werner, F. Hauff)

The SO-249 BERING project is a long-term international collaboration between German, Russian, and U.S. American scientists and encompasses two legs: (1) from Dutch Harbor, Alaska to Petropavlovsk-Kamchatsky, Russia, and (2) from Petropavlovsk to Tomakomai, Japan. The overall goal of the SO-249 BERING cruises is to study the geodynamic evolution of the southern and western margins of the Bering Sea, formed by the Aleutian Subduction Zone and Chukotka-Beringian continental margin respectively, and the northwestern Pacific seafloor, being subducted beneath the Aleutian and Kamchatka arcs. The ship-based mapping, sediment profiling and sampling of seafloor structures, combined with planned shore-based evaluation of the mapped seafloor morphology and petrographic, petrological, geochemical and geochronological studies of the obtained samples, will contribute to an improved understanding of the origin of marginal seas, the initiation and geodynamic evolution of subduction zones, the affect of variation in the composition and structure of the subduction input on the output at the volcanic arc, as well as the causes and effects of natural hazards, such as explosive volcanic eruptions.

More specific scientific questions include:

1) *Pre-Aleutian subduction history of the Beringian Margin*: What is the nature of the Beringian and Chukotka Margins and their junction? Do they represent (I) an extinct subduction margin extending from Chukotka to Alaska in the Paleogene, (II) a transform fault boundary along the Chukotka margin and subduction zone along Alaskan margin, or (III) amalgamated terranes of different age and composition (e.g. submarine plateau and subduction zone)? Is the cessation of volcanism on these margins correlated with the initiation of the Aleutian Arc and other large-scale tectonic events around the Pacific?
2) *Aleutian arc inception and evolution*: What is the age and composition of the oldest rocks in the western Aleutian Arc? Can inception of the arc be linked to other key tectonic events in the Pacific such as the Hawaiian-Emperor Bend at ~50-47.5 Ma, inception of the IBM and Tonga Arc at 50-52 Ma, or collision of the Olyutorsky Arc with Kamchatka at ca. 51-54 Ma?
3) *Modern Aleutian arc system*: What is the origin and occurrence of recent magmatic activity in the Western Aleutian Arc? Is there a continuous volcanic front in the western Aleutians west of Buldir Island? How is the distinctive geochemical character of western Aleutian volcanic rocks related to volcanism in the central and eastern Aleutians and in island arcs globally?
4) *Arc Input*: What are the ages and the spatial-temporal variability in composition of the subducting Pacific lithosphere offshore the Aleutian Arc and Kamchatka? To what extent is the chemistry of the volcanic arc output related to the subduction input? Do subducted oceanic Fracture Zones deliver particularly large amounts of volatile and fluid-mobile elements to the mantle wedge, causing enhanced partial melting of the wedge and enrichment in fluid-mobile elements in arc magmas?

The SO-249 cruises also included a biology program which aims at investigating the diversity of the benthic meio- and macrofauna of areas in the Northern Pacific Ocean in close proximity to the Aleutian Islands (SO249 Leg 1) as well as in the northern and western areas of the Bering Sea (SO249 Leg 2). Apart from a general sampling effort, obtaining deep sea specimens belonging to several specific metazoan taxa was of particular interest for a number of ongoing research projects. These included studies on lamp shells (Lophotrochozoa: Brachiopoda), where a major goal was to collect - for the first time - mantle tissue for immunohistochemical analysis from deep sea specimens. This material is intended to contribute to research on the presence of ciliary photoreceptors in brachiopods (Passamaneck et al. 2011). A further taxon of specific interest were soft corals (Cnidaria: Alcyonacea), in particular specimens of the deep sea taxa Chrysogorgiidae and Isididae. The aim here was to obtain whole specimens with one or more associated cephalopod eggs glued to the coral by a dumbo octopus (Cephalopoda: *Grimpoteuthis*). Such material is known to occur in similar habitats of the Northwestern Atlantic (Verrill 1885, Watling et al. 2011) and recent observations suggested that soft corals present in the study areas (Heifetz et al. 2005, Grebmeier et al. 2006, Lumsden et al. 2007) could show a similar association with eggs of dumbo octopods. Such a finding would constitute the first proof

of the presence of this group of deep sea octopods in the Northwestern Pacific (Voss & Pearcy 1990, Collins & Villanueva 2006). A third group of marine invertebrates of particular interest were brittle stars (Echinodermata: Ophiuroidea). Here, the goal was to obtain - from deep sea specimens - fresh tissue samples that would be suitable for immunohistochemical as well as genomic and transcriptomic analyses. A recent study showed that light perception in infaunal brittle star species is very likely to be mediated by c- and r-opsins (Delroisse et al. 2014) - therefore, obtaining fresh tissue samples from a number of deep sea brittle star taxa would permit to test hypotheses related to the evolution of light sensing in echinoderms (Ullrich-Lüter et al. 2011). One further aim was to collect various species of sea urchins (Echinodermata: Echinoidea) in order to complement the existing list of taxa scanned using non-invasive imaging techniques (Ziegler 2012, Ziegler et al. 2014).

Integration of the results of studies conducted by the SO-249 BERING project with those of previous investigations (in particular KOMEX and KALMAR), and of the work being carried out in the GeoPRISMS initiatives will substantially improve our understanding of the magmatic and tectonic evolution of the Aleutian-Kamchatka-Junction and arc systems in general. Combined with the results from recent IODP drilling into the IBM forearc and backarc and with those from the complementary SO-255 VITIAZ SONNE cruise to investigate the Vitiaz-Kermadec Arc/Backarc System, scheduled for the beginning of 2017, we should gain additional important new insights into the workings of subduction systems and the origin of marginal basins.

5. AGENDA OF THE CRUISE

(R. Werner, K. Hoernle, B. Baranov, M. Portnyagin)

To achieve the scientific goals of the BERING project, the SO-249 cruises should conduct systematic multi-beam mapping and hardrock sampling by dredging in the Komandorsky Basin, the western Aleutian Arc, the northwestern Bering Sea and the northwestern Pacific (Fig. 5.1).

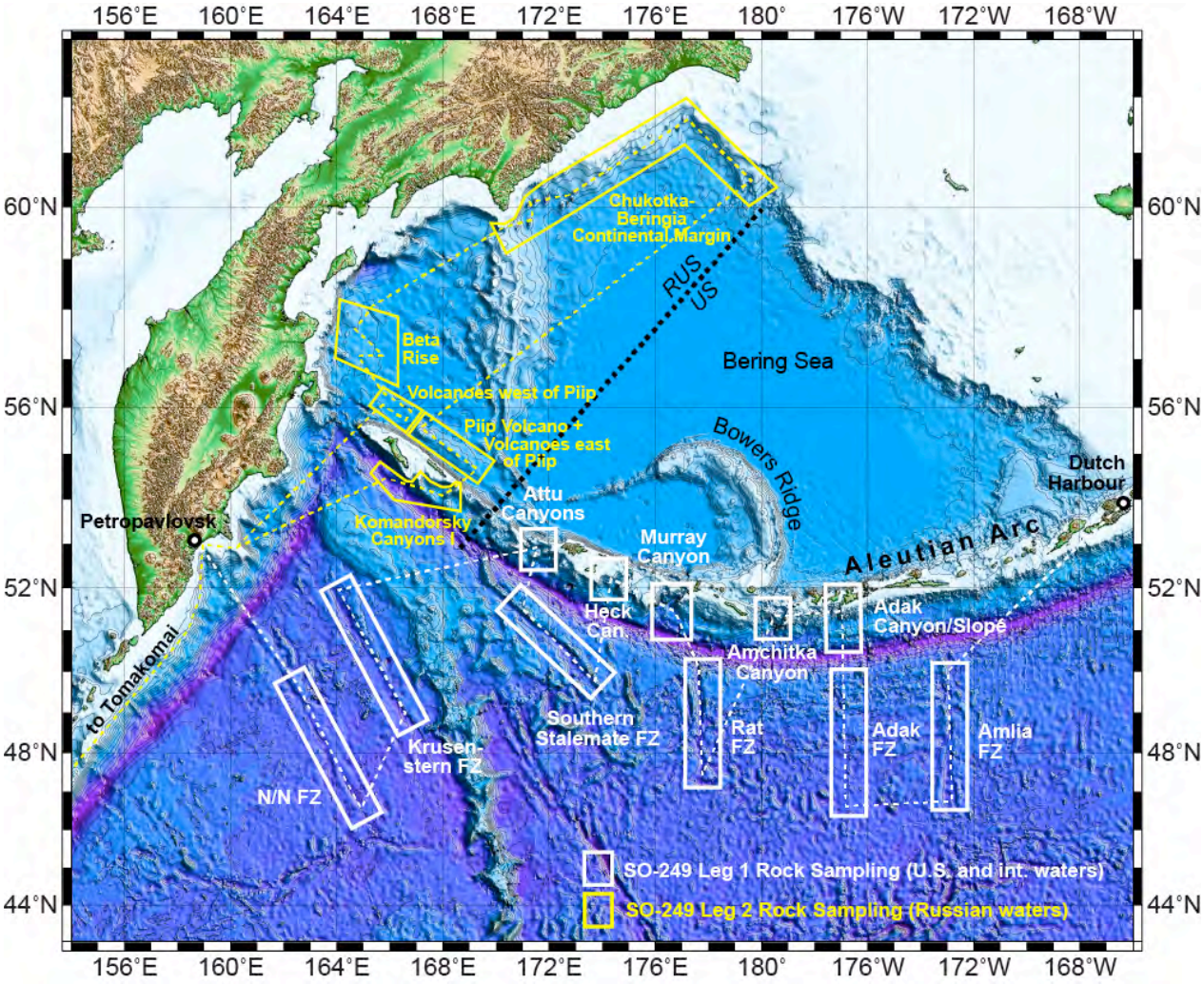


Fig. 5.1: Overview map showing the major working areas of the SO-249 BERING cruises (bathymetry based on 'The GEBCO_08 Grid, version 20091120, http://www.gebco.net). White frames mark the 11 working areas for hard rock sampling of Leg 1 in U.S. and international waters, yellow frames mark the five working areas for hard rock sampling of Leg 2 in Russian waters. The dashed lines illustrate planned ship´s tracks for both legs.

In order to decipher the nature of the junction of the ***Chukotka and Beringian margins***, we planned to carry out rock sampling on the shelf slopes and on the Chukotka Seamounts on the edges of the shelves. Maps based on satellite altimetry reveal at last 15 seamounts up to c. 2,000 m high in that area and relatively steep shelf slopes in particular at the western Chukotka and the northern Beringian margins. Due to the lack of high resolution bathymetry, extensive multi-beam mapping was planned to locate the most promising stations for rock sampling. Sampling of several seamounts and at the shelf slope should provide a representative sample set to reconstruct age and composition of these structures.

Dredging of the ***deep canyons and faults in the arc basement*** in the fore arc as well as from the lower trench slope in the Adak area and further west should provide samples for reconstructing arc initiation and early arc evolution, whereas accreted terranes can provide information about past subduction input. The basement outcrops include not only the two major

submarine canyons of the arc (Adak and Murray), which have only been explored in reconnaissance fashion thus far (Jicha et al., 2006), but also the largely unexplored Amchitka, Heck and Attu Canyons and the lower trench slope (which has been successfully sampled at IBM and Tonga Arc). In the far western Aleutian Arc, SO-249 should focus on the Komandorsky area, where strike-slip faulting has produced deep basement exposures in the fore arc (Scholl et al., 1983). To locate appropriate dredge stations, extensive multi-beam surveys of each canyon were planned. Subsequent dredging aimed to get a representative sample set of the Aleutian arc basement between 167°E and 176°W (i.e. a c. 1,200 km along arc profile).

To extend our knowledge on the origin, occurrence and evolution of ***young volcanism in the western Aleutian Arc***, we planned multi-beam mapping and extensive sampling of potential volcanic structures (e.g. volcanic cones) in a high heat flow area west of Piip-Volcano and in the area to the east of Piip Volcano but west of the Western Cones as well as at the Volcanologists Massif including Piip. Single beam echosounding apparently revealed a SE-trending chain of prominent cone-like structures east of Piip, which is associated with a heat flow anomaly. We calculated extensive multi-beam mapping to verify the single-beam maps and to locate appropriate dredge sites. Sampling of these structures should provide a sample set being appropriate to reconstruct their nature and origin and to detect possible compositional variations within this seamount chain. The area northwest of Piip volcano is characterized by a strong heat flow anomaly being even more distinct than the anomaly associated with the seamount chain west of Piip. Since other heat flow anomalies in the Komandorsky Basin are associated with (young) volcanic structures, young volcanism may also exist northwest of Piip. Therefore we planned a multi-beam survey in this high heat flow area to possibly identify volcanic (and/or tectonic) structures and several dredge stations for comprehensive sampling.

To verify if the anomalously high heat flow in the ***Beta Rise area*** is associated with magmatic activity, accessible structures identified on R/V Vulkanolog cruises, on SO201-2, and by further mapping should be sampled, allowing us to address questions regarding the origin of this heat flow anomaly. On KALMAR cruise SO201-2 even a single track across this area revealed by then unkown volcanic (?) cones (not recorded due to permission issues). Consequently we expected to identify a variety of volcanic and/or tectonic structures by a systematic multi-beam survey of the Beta Rise area. Dredge stations at each of the two features on the Beta FZ revealed by R/V Vulkanolog cruises and sampling of additional features to be identified at Beta Rise should yield a representative sample set of the Beta Rise structures.

In order to characterize the age and composition of the ***Pacific lithosphere*** subducting beneath Kamchatka and the Aleutian Arc, we planned studies of fracture zones (FZs), where layers 2 to 4 of oceanic lithosphere may be exposed (as shown by SO201-1b at the northernmost part of the Stalemate FZ and the Emperor Trough [e.g. Werner and Hauff, 2009] and by SO-199 at the Investigator Ridge in Indian Ocean [e.g. Werner et al., 2009, Hoernle et al., 2010]). Bathymetric and geophysical profiling has been carried out along several profiles crossing the Krusenstern FZ on SO201-1a, providing comprehensive preliminary information for determination of dredge locations. The N/N, Rat, Adak and Amlia FZs (Fig. 5.1) should be mapped and sampled for the first time. The southeastern part of the Stalemate FZ should be mapped and sampled to complete reconnaissance sampling at its northwestern part performed during SO-201-1b. Taken together, sampling of the six FZs located in the northwestern Pacific covers a profile from c. 160°E to 170°W across the Pacific lithosphere subducting beneath the western Aleutians and Kamchatka. Combined with the samples and data yielded on SO201-1b, this sampling strategy should allow for the first time a comprehensive lateral reconstruction of age and composition of the NW-Pacific lithosphere.

All working areas discussed above have been selected in coordination with our Russian and U.S. partners based on the results of previous cruises (e.g. SO201-1b und -2, R/V Vulkanolog; WAVE cruise with R/V Thompson) and data sets such as Etopo (Smith and Sandwell, 1997) and GEBCO (The GEBCO_2014 Grid, version 20150318, http://www.gebco.net).

5. BRIEF INTRODUCTION INTO THE WORKING AREA

(G. Yogodzinski and K. Hoernle)

6.1 GEODYNAMIC OVERVIEW OF THE BERING SEA REGION

The Bering Sea is a marginal basin bordered by the Alaskan continental margin in the northeast, the Kamchatka-Chukotka (Siberian) margin in the west, and the Aleutian Subduction Zone in the south (Fig. 6.1). The Alaska-Siberia margin is often collectively referred to as the Beringian Margin. The deep-water subbasins of the Bering Sea and related structures that lie just north of the Aleutian Islands have varied origins that are incompletely known. The Komandorsky Basin, which lies west of the Shirshov Ridge (Fig. 6.1), appears to be Middle Miocene in age, based on a K-Ar age of 9 Ma on basement rocks and biostratigraphic control from the overlying sediment in ocean drilling cores at DSDP site 191 (Creager et al. 1973; Stewart et al. 1973; Baranov et al., 1991). The age of the Bower's Basin is not directly constrained, but was likely active at the time of Bowers Ridge volcanism, which is now known to be 22-32 Ma, based on new $^{40}Ar/^{39}Ar$ ages for volcanic rocks from the crest of the ridge and backarc seamounts (Wanke et al. 2012; Sato et al., 2016). Thus, the Bowers and Komandorsky Basins appear to have formed in the Oligocene-Miocene, in a time period when subduction and arc volcanism along the Aleutian arc were underway (47Ma to the present; Jicha et al. 2006; Höfig et al., 2013).

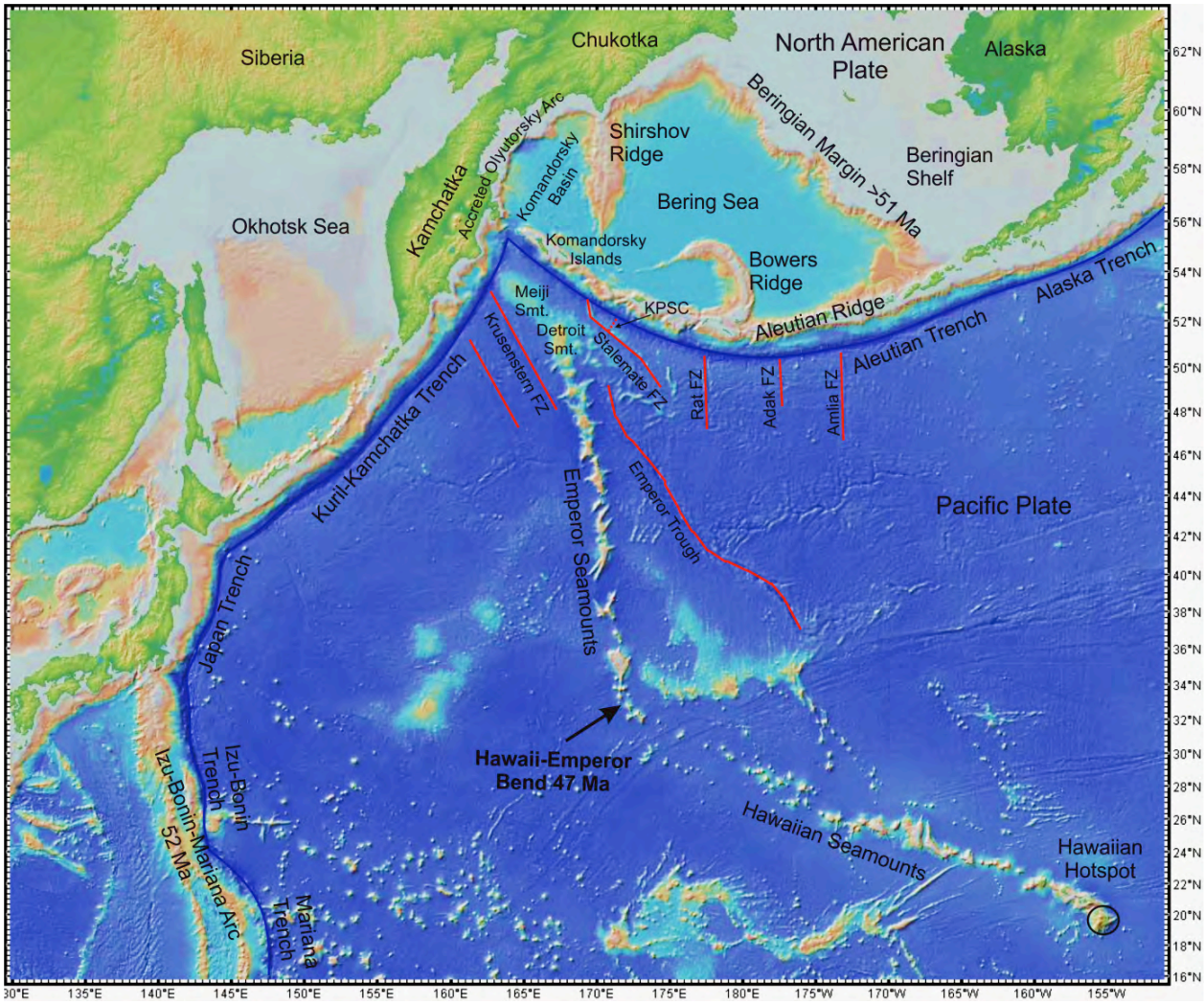


Fig. 6.1: Physiographic and tectonic map of the Kamchatka-Aleutian system relative to other major features of the North Pacific. Red lines indicate major fracture zones (FZ) in the NW-Pacific. KPSC is a fragment of the paleo-Kula-Pacific spreading center mapped and sampled during the SO201-1b KALMAR expedition (source of the map: GeoMapApp (http://www.geomapapp.org).

Basement rocks in the central part of deep Bering Sea Basin, south of the Alaska-Siberia continental margin are buried by at least 2-3 km of sediment (Creager et al. 1973), and so cannot be reached by conventional ocean drilling. The thick sediment cover also masks the underlying morphology of the basement making interpretation of its age, morphology and origin difficult. Cooper et al. (1976) identified north-south magnetic lineations in this part of the Bering Sea, which they interpreted to be Cretaceous in age. On this basis, oceanic lithosphere of the Bering Sea has long been interpreted to have been captured when the subduction margin jumped to the south from the Alaska-Siberian continental margin to the Aleutian island arc (Cooper et al. 1976; Davis et al. 1989; Lonsdale 1988; Marlow et al. 1973; Scholl et al. 1975).

In accordance with the plate-capture model, the initial formation of the Bering Sea is coincident with the onset of Aleutian magmatism and the end of subduction magmatism along the Alaska-Siberia margin (e.g., Scholl et al., 1975; Davis et al. 1989; Lonsdale 1988). Late-Cretaceous to early Tertiary magmatism in western Alaska (Moll-Stalcup and Arth 1989; Moll-Stalcup 1994) and along the edge of the Alaska continental shelf (Davis et al. 1989) indicate that magmatism along the Beringian Margin ended in Eocene time, at approximately 49-56 Ma. Relatively few radiometric ages are available for the Siberian side of the Beringian Margin, but a similar Early Eocene timing for terrane accretion and cessation of magmatism also appear likely (Chekhovich et al. 1999). In the Aleutians, a recent campaign of sample collection and geochronology has shown that the oldest outcrops on the islands are usually less than 40 Ma, though rare samples from Medny Island and a dredge sample from Murray Canyon in the Aleutians forearc near Kiska, have returned ages of 46-47 Ma (Jicha et al. 2006; Kay et al. 2014; Schaen et al. 2015; Höfig et al., 2013).

Thus, the current model for the formation of the Bering Sea hinges on understanding the timing of magmatic events in the Aleutians and along the Beringian Margin that is highly incomplete. This is a key justification in the BERING Project for geochemical and geochronological studies of submerged outcrops in the Aleutian forearc, which have never been systematically sampled and analyzed, and for studies of similar rocky exposures along the Siberian side of the Beringian margin (Chukotka margin). This work on submerged outcrops compliments ongoing work of US investigators funded to study plutonic and volcanic rocks exposed on the Aleutian Islands under NSF's GeoPRISMS program.

6.2 OVERVIEW OF THE ALEUTIAN SUBDUCTION SYSTEM: INPUT-OUTPUT & EVOLUTION

Spatial and temporal changes in the input and geodynamics of the Aleutian subduction zone have influenced the evolution of the volcanic output through time. At present, the relative Pacific-North America plate motion changes little along the Aleutian arc, from 68 mm/yr and 325° near Unimak Island at the western tip of the Alaska Peninsula, to 76 mm/yr and 312° near Attu Island in the westernmost segment of the arc (DeMets et al., 1994). However, the convergence rate at 90° to the strike of the trench, which is essentially the rate of plate consumption, changes dramatically along-strike from 68 mm/yr near Unimak, where convergence is approximately orthogonal, to slightly less than 2 mm/yr at the longitude of Attu where convergence is highly oblique (Kelemen et al., 2003; Cross and Freymueller, 2009). West of 168°E, in the Komandorsky Island area, the trench-normal convergence rate is zero and the plate boundary is a transform fault (Cross and Freymueller, 2008).

Convergence rates along the Aleutian arc are correlated with average volcano size, which decreases from east to west. Shishaldin is the largest volcano (~400km^3), whereas Buldir, Ingenstrem Depression, the western cones and Piip volcanic centers are the smallest (≤10km^3; Fournelle et al., 1994). Beneath the area east of Buldir Island (~166°E), seismic tomographic images show a fast shear-wave velocity anomaly at depths >100 km, which is interpreted to be the subducting Pacific Plate (Levin et al., 2005). West of Buldir Island, where the motion of the Pacific Plate is nearly parallel to the arc, there is no deep- or intermediate-depth seismicity (i.e., Benioff Zone - Hayes et al., 2012). From 164°E to 173°E, the seismic velocities are slow relative to the surrounding mantle and there is a gap in seismicity, leading to the conclusion that there is an opening in the subducting slab. This "slab portal", has been interpreted to reflect a tear in the subducting plate to accommodate the ~90° bend it makes at the juncture between the two subduction zones (Levin et al., 2005; see also Yogodzinski et al., 2001).

The Aleutian trench contains primarily Pacific oceanic sediment overlain by continental turbidites, which are transported down the trench axis from the Gulf of Alaska (Scholl et al.,

1983). Trench sediment thickness increases with increasing trench depth from 165° to 173° W longitude, where the sediment column thins abruptly over a basement high on the Amlia Fracture Zone (Kelemen et al., 2003). From this point westward, sediments thin slowly and then more abruptly over basement highs southwest of Attu Island, where primarily oceanic sediment overlies the Stalemate Fracture Zone and fossil Kula-Pacific ridge that extend into the trench (Kelemen et al., 2003; Lonsdale, 1988). Sediment flux to the arc, calculated as the product of orthogonal subduction rate and trench sediment thickness, initially increases from east-to west, then drops abruptly at the Amlia Fracture zone (Kelemen et al., 2003), where maximum impact of subducted sediment and seawater altered oceanic crust are expressed in volcanic rocks from Seguam Island (Singer et al., 1992; 2007). West of the Amlia Fracture Zone, sediment flux to the arc decreases progressively westward, reflecting primarily the decreasing orthogonal convergence rates along the arc (Kelemen et al., 2003). A large uplifted block at the end of Stalemate FZ, blocks the sediment supply from the east. To the west, the sediment is derived from Siberia via the Bering Straits.

The subducting sediment load influences the forearc morphology along the arc. Where the sediment load is large, sediments are accreted to the margin forming a well-defined accretionary wedge with forearc basin and forearc high. In the west, where the sediment load is low, there is little evidence of a forearc basin, instead a steep scarp separates the trench from the southwestern margin of the older western volcanic front.

The age and structure of the subducting igneous oceanic basement also varies along strike of the subduction zone (Londsdale, 1988). The magnetic chrons of the subducting ocean crust east of the Rat FZ are subparallel to the trench. Amlia, Adak and Rat FZs show left-lateral offsets based on the magnetic data. East of the Amlia FZ, the subducting Pacific Plate crust is younger than chron 29 (~65 Ma; ages of chrons from Candie and Kent, 1995). West of the Amlia FZ, the Pacific crust is younger than chron 25 (~56 Ma) extending to the Rat FZ. Beginning at the Rat FZ, the orientation of the chrons rotates from being subparallel to the trench to being orthogonal to the trench and range from chron 23 to 19 with the crustal age varying from ~52-41 Ma.

Because magnetic lineations on the north Pacific seafloor are oriented parallel or oblique to the strike of the plate boundary (Lonsdale, 1988; Atwater et al., 1989), the age of the subducting oceanic lithosphere changes relatively little along the Aleutian arc. For example, chron 21 (47 Ma) is entering the trench at the tip of the Alaska Peninsula, the eastern extremity of the arc, but also at Buldir Volcano, the westernmost emergent volcano in the arc. In between, most of the Pacific Seafloor entering the trench is at chron 22-25 (49-57 ma), and the oldest is at chron 28-30 (64-66 Ma) just east of the Amlia Fracture Zone. Kelemen et al. (2003) addressed the question of how this pattern may have been different in the past, and concluded that the lateral gradients in slab age/temperature along the arc were never great. They cite the Miocene as an example, when the lithosphere entering the trench was on average, 32 Ma east of Adak Island, and approximately 49 Ma at Little Sitkin, Buldir and areas further west. In the far western part of the arc, southwest of Attu Island, a small piece of the Kula Plate, the only part of the Kula Plate still exposed in the Pacific Ocean, is subducting between fossil Kula-Pacific Spreading Center and the Stalemate FZ (Fig. 6.1). To the west of the Stalemate FZ, some of the oldest crust on the seafloor, Early Cretaceous to Jurassic crust of the Pacific Plate, is located outboard the westernmost Aleutians. The Jurassic Pacific seafloor is actively subducting beneath Kamchatka. The Emperor Seamounts of the Hawaiian hotspot track are also subducting beneath northeast Kamchatka and may have also subducted beneath the westernmost Aleutians in the past, although accreted Emperor Seamounts with ages of 93-120 Ma have been found in the Kamchatka forearc (Portnyagin et al., 2008).

Along-strike differences in subduction input can be seen in the output of the arc volcanoes. This is most clearly expressed in isotopic compositions, which show a clear signal of subducting sediment in the east (radiogenic Sr and Pb, unradiogenic Hf and Nd), which peaks at Seguam Island, near the Amlia fracture zone, and then declines progressively through the central and to the western parts of the arc (Yogodzinski et al., 1994; 2010; Kelemen et al., 2003; Singer et al., 2007).

Temporal geochemical development of Aleutian arc magmatism is poorly constrained, because until recently, there have been few studies of the pre-Quaternary rocks. Kay and Kay (1994) noted that, similarities between pre-Miocene volcanic rocks and rocks of the modern volcanoes are more striking than are their differences. On Adak Island, basalts and andesites of

the Eocene-Miocene age Finger Bay Volcanics (Fraser and Snyder, 1959) have relatively flat rare-earth element patterns (La/Sm<3) and moderate enrichments in Ba and Th (Ba/La<40, Th/La<0.3). These characteristics contrast the compositions of the modern volcanoes which stronger enrichments in light rare earth elements, Ba and Th (Kay & Kay, 1994). Recent work by Schaen et al. (2015) has confirmed this pattern in volcanic rocks sampled and dated in the Delarof Island region, near Tanaga and Gareloi volcanoes, west of Adak. This work also confirms the general pattern on Adak and other islands which show that the volcanic front has migrated systematically in the Aleutians from south to north in the Eocene-to-present time period (Kay and Kay, 1994).

Boninites, which are widespread in the early development of western Pacific arcs (Meijer, 1980) appear to be absent from the Aleutians, as are the classic island arc tholeiites (Jakes and Gill, 1970), which have unfractionated or depleted rare-earth element patterns but strong enrichments in Ba and other fluid-mobile elements. One exception may be Attu Island, which is dominated geologically by an oceanic assemblage of pillow basalt, diabase and gabbro (Gates et al., 1971; Vallier et al., 1994). The dominant geochemical types in Eocene-Oligocene-age basement rocks are depleted tholeiitic basalts with trace element and isotopic compositions similar to normal MORB. These depleted, MORB-like basalts range to more enriched compositions that resemble first EMORB and then arc tholeiites, which have strong depletions in Ta and enrichments in Th relative to La (Yogodzinski et al., 1993). Only in the Miocene-age rocks on Attu are calc-alkaline andesites and dacites present, which resemble similar age rocks from the Komandorsky Islands (Borusk and Tsvetkov, 1982; Höfig et al., 2013) and from Piip Volcano (Tsvetkov, 1991; Yogodzinski et al., 1994).

In the westernmost Aleutians (Komandorsky Islands), there is a general trend through time from tholeiitic (basalt to rhyolitic) volcanism with typical subduction zone characteristics from 47 Ma to more adakitic and calc-alkaline compositions in the Oligocene and Miocene (Höfig et al., 2013). Volcanism in the Komandorsky Island and Attu area ended in the late Miocene and Pliocene (Yogodzinski et al., 1993; Höfig et al., 2013; Kay et al., 2014) when the volcanic front migrated to the north, where it is now expressed by seafloor volcanism from the Ingenstrem Depression, just west of Buldir Island, to Piip Volcano, north of Medny Island. In this setting, volcanism has produced a wide range of compositions from high-MgO arc basalts, to high-Mg# and adakitic-type andesites, dacites and rhyodacites, interpreted to be melts from the subducting slab edge at the margin of the slab portal mentioned above (Yogodzinski et al., 2014).

7. METHODS AND DESCRIPTION OF STATIONS

7.1 METHODS

(R. Werner, A. Ziegler, W. Borchert)

7.1.1 Bathymetry (Kongsberg Maritime EM122 and EM710)

Data Acquisition

R/V SONNE is equipped with Kongsberg Maritime EM 122 and EM710 multi-beam echo sounder systems for continuous mapping of the seafloor. The systems consist of several units. A transmitter/receiver transducer array is fixed in a mills cross below the keel of the vessel. A preamplifier unit contains the preamplifiers for the received signals. The transceiver unit contains the transmitter and receiver electronics and processors for beam-forming and control of all parameters with respect to gain, ping rate and transmit angles. The system has serial interfaces for vessel motion sensors, such as roll, pitch and heave, external clock and vessel position. The systems also include high performance PC workstations. The operator software is the Seafloor Information System (SIS) running under Windows XP or Win7, which processes the collected data, applying corrections, displays the results and logs the data to internal or external disks.

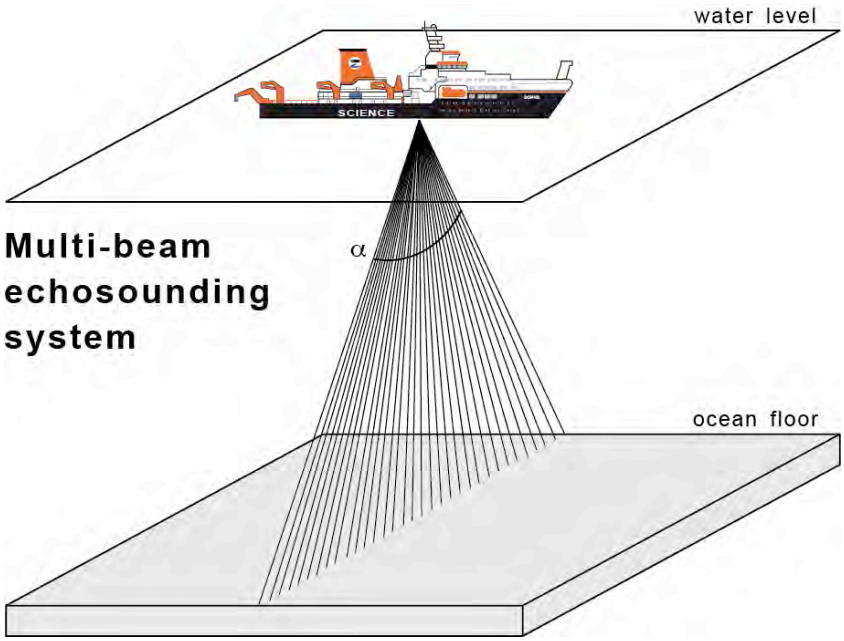


Fig. 7.1: Schematic sketch illustrating the principle mode of operation of multi-beam echo-sounding systems. The whole angular coverage sector (α) of the Kongsberg EM 122 system amounts is up to 150°.

The EM122 system uses a frequency of about 12 KHz with a whole angular coverage sector of up to 150° (75° per port-/starboard side, Fig 7.1.). The depth range amounts to 20 - 11,000 m. The system has up to 288 beams and 432 soundings, respectively, per swath with pointing angles automatically adjusted according to achievable coverage or operator defined limits. The ping-rate depends on the water depth and the runtime of the signal through the water column. The variation of angular coverage sector and beam pointing angles was set automatically. This optimizes the number of usable beams. During a survey the transmitter fan is split into individual sectors with independent active steering according to vessel roll, pitch and yaw. This forces all soundings on a line perpendicular to the survey line and enables a continuous sampling with a complete coverage. Pitch and yaw movements within ±10 degrees and roll movements within ±15 degrees are automatically compensated by the software. Thus, the EM122 system can map the seafloor with a swath width about up to six times the water depth (to approximately 30 km). The geometric resolution depends on the water depth and the used angular coverage sector and is less than 10 m at depths of 2,000 - 3,000 m.

The higher frequency multi-beam echo sounder EM710 operates at sonar frequencies in the 70 to 100 kHz range with a whole angular coverage sector of up to 140°. The minimum acquisition depth is from less than 3 m below its transducers, and the maximum acquisition depth is up to 2,000 m. The number of beams are 256 or 128, respectively, with dynamic focusing employed in the near field. The distribution pattern may be set to be either equiangular or equidistant. All received beams are electronically roll stabilized. High density beam processing mode provides up to 400 or 200 soundings per swath by using a limited range window for the detections, which in practice is equivalent to synthetically sharpening the beam width. The cross track coverage (swath width) is up to 5.5 times water depth to a maximum of more than 2,000 m. Combined with the EM 122, the EM 710 will provide a total system solution that meets the strictest IHO (International Hydrographic Organization) requirements for all water depths. The combined EM122 and EM710 systems have successfully been used on SO-249 Leg 2 for detailed mapping of Piip volcano.

The accuracy of the depth data obtained from the system is usually critically dependent upon weather conditions and the use of a correct sound velocity profile. During SO-249 five sound profiles has been determined using a CTD ensuring the use of the correct sound velocity on this cruise. The first sound profile has been measured at the beginning of the cruise when R/V SONNE arrived in the first working area, further CTDs have been deployed at the Krusenstern fracture zone, in the Komandorsky area at the beginning of Leg 2, at the Beringian margin and at the Beta Rise (see Appendix I).

Data Cleaning and Processing

The data cleaning procedure was accomplished by the QPS Qimera V. 1.3 software. After loading the raw data (.all files) from the EM122 and EM710, respectively, and the correct sound velocity profile, a first filtering of failed beams has been conducted. Subsequently a dynamic surface has been created showing the ship´s track and the raw data (Fig. 7.2).

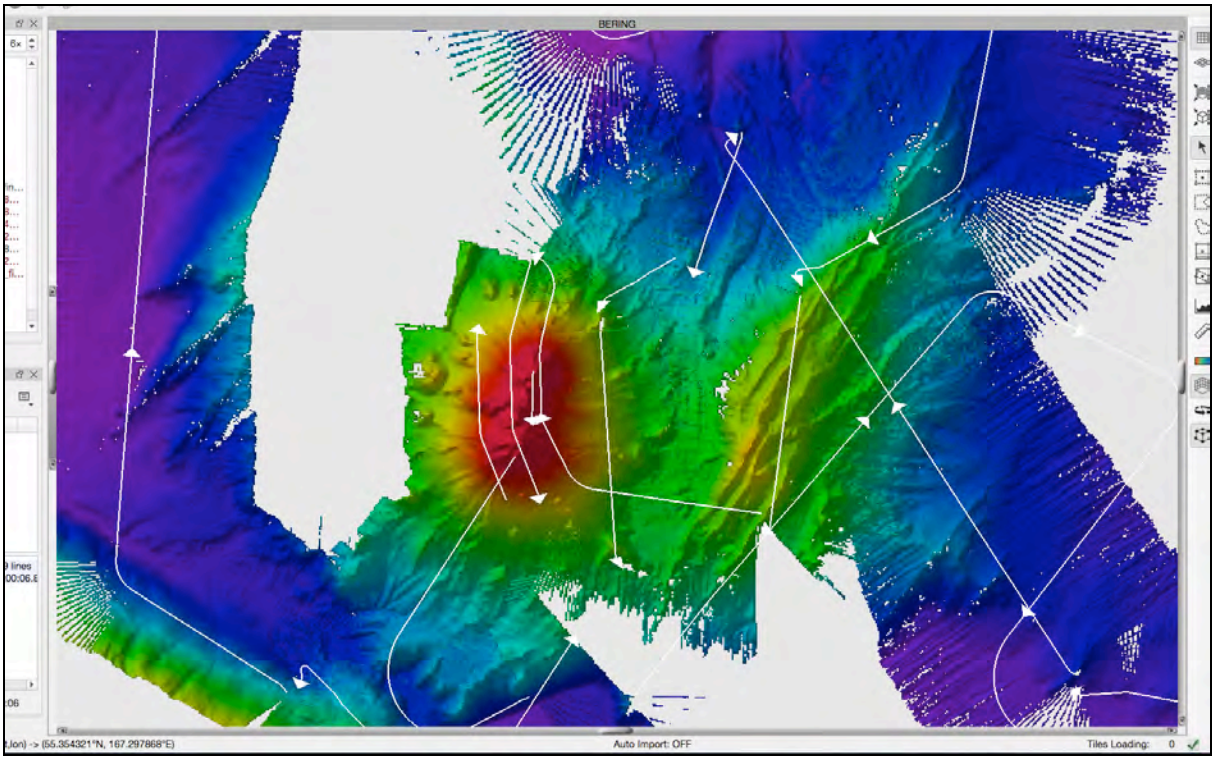


Fig. 7.2: Dynamic surface created with Qimera V 1.3 showing the raw data and the ship´s track.

Qimera allows an automatic elimination of major erratic data points using a spine filter. Furthermore there are several tools for detailed elimination of erratic data points, for example a swatch editor, a 2D editor or a 3D editor (Fig. 7.3) which all enable the operator the process each single beam stepwise. All editors display not only the cleaned data but also, if desired, the rejected data points and offer a variety of visualizations of the data (according to files,

depth, intensity etc.). Additionally the data can be cleaned and edited using CUBE (Combined Uncertainty and Bathymetry Estimator, by University of New Hamshire).

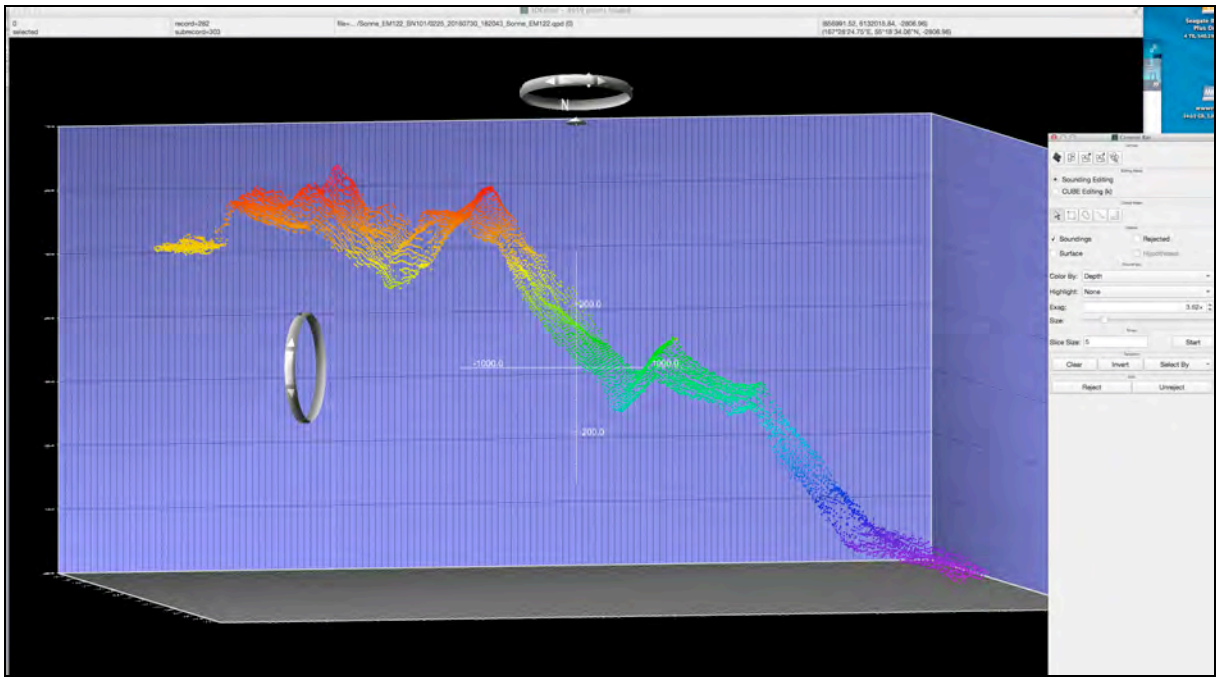


Fig. 7.3: 3D editor of Qimera V 1.3.

After data cleaning a static surface has been generated from the dynamic surface, creating a .sd file which can be loaded in the QPS Fledermaus software, allowing 3D visualization of the cleaned data (see chapter 7.2). Furthermore the data can be exported in an ASCII x,y,z file format with header information for assembling, gridding and contouring with the GMT software (Wessel and Smith 1995). All this work was done by the system operators of R/V SONNE.

7.1.2. Sediment Echo-Sounding (Atlas PARASOUND P70)

Sub-bottom profilers (or sediment echo-sounding systems) are used to display sub-seafloor geological structures as, for example, marine sediment successions. The ATLAS PARASOUND sub-bottom profiler acts as a low-frequency sediment echo-sounder and as high-frequency narrow-beam sounder to determine the water depth. The sub-bottom profiler is based on the parametric effect, which is produced by additional frequencies through nonlinear acoustic interaction of finite amplitude waves. In principle, if two sound waves of similar frequencies (18 kHz and e.g. 22 kHz) are emitted simultaneously, a signal of the difference frequency (e.g. Secondary Low Frequency of 4 kHz) is generated for sufficiently high primary amplitudes. This new component is traveling within the emission cone of the original high frequency waves, which are limited to an angle of only 4.5° for the equipment used (Fig. 5.2.). The resulting footprint size of only 7 % of the water depth is much smaller than for conventional systems and both vertical and lateral resolution is significantly improved.

The ATLAS PARASOUND system is permanently installed on R/V SONNE. The hull-mounted transducer array has 128 elements within an area of 1 m^2. It requires up to 70 kW of electric power due to the low degree of efficiency of the parametric effect. The PARASOUND sub-bottom profiler on R/V SONNE is equipped with the digital data acquisition software from ATLAS Hydrographic, which is subdivided in ATLAS Parastore and ATLAS Hydromap Control. ATLAS Parastore allows the buffering, transfer and storage as well as the visualization of the digital echograms at very high repetition rates. ATLAS Hydromap Control is responsible for user defined modifications of the system (e.g. pulse rate or mode) and supports the operator in running the system properly.

PARASOUND data have been recorded during all SO-249 bathymetric surveys. During the cruise, however, only online profiles displayed on the screen have been used to identify tectonic features. The data acquisition included PHF and SLF data. All data have been copied

on an external hard disk and sorted by the operator into folders according to data type (PHF, SLF / ASD, PS3, SEGY) and recording dates (0 to 24 hours UTC). After the cruise the entire PARASOUND data set will be transferred to data co-operating specialists for further shore based processing and analyses and is archived in international data banks.

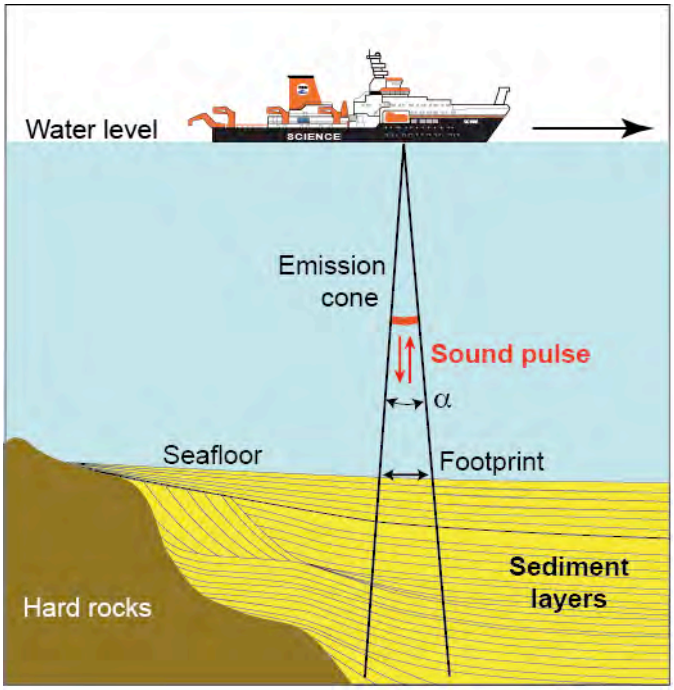


Fig. 7.4: Schematic sketch illustrating the principle mode of operation of sub-bottom profilers. The extremely narrowed beam of the ATLAS PARASOUND system of 4.5° (α) allows to resolve even small-scale bottom structures and offers a deeper penetration of up to ~200 m into the seafloor.

7.1.3 Dredging, Site Selection, and Laboratory Work

Rock sampling on SO-249 was carried out using rectangular chain bag dredges. Chain bag dredges are similar to large buckets with a chain bag attached to their bottom and steel teeth at their openings, which are dragged along the ocean floor by the ship´s winch.

General station areas were chosen on the basis of a number of existing datasets. These mainly include predicted bathymetry, derived from gravity data and ship depth soundings (etopo by Smith and Sandwell [1997] and "The GEBCO_2014 Grid, version 20150318", http://www.gebco.net), published data, maps, and profiles as well as unpublished data and information kindly provided by our Russian and U.S. American colleagues and Dr. Christoph Gaedike (Bundesnastalt für Geowissenschaften und Rohstoffe).

The final selection of dredge sites was critically dependent on detailed multi-beam echo-sounding surveys carried out at each site before dredging. Final positioning of the vessel over the dredge station was based on the bathymetric data gained on these surveys including considerations of wind, swell and drift conditions. Dredge tracks were usually located - depending on the morphology of the structures - on steep slopes, at plateau edges, at scarps, canyon walls, fracture zones, and on the flanks of cones and larger seamounts. This was mainly done to avoid areas of thick sediment cover.

Shipboard Procedure

Once onboard, a representative selection of rocks were cleaned and cut using a rock saw. They were then examined with a hand lens and microscope, and grouped according to their lithologies and degree of submarine weathering. The immediate aim was to determine whether material suitable for geochemistry and radiometric age dating had been recovered. Best suitable samples have an unweathered and unaltered groundmass, empty vesicles, glassy rims (ideally), and any phenocrysts that are fresh. If suitable samples were present, the ship moved to the next station. If they were not, then the importance of obtaining samples from the station was weighted against the available time.

Fresh blocks of representative samples were then cut for post-cruise thin section and microprobe preparation, geochemistry and further procedures to remove manganese and alteration products and/or to extract glass (if applicable). Each of these sub-samples, together with any remaining bulk sample, was described, labeled, and finally sealed in either plastic bags or bubble wrap for transportation to GEOMAR or cooperating institutions. Additionally bulk surface sediment was sampled at each station from the sediment traps installed in the dredges being in particular relevant for the reconstruction of subduction input. The sediment was dried in single use alumina trays at 110°C and sealed in plastic bags for analyses.

Shore Based Analyses

Magmatic rocks sampled by R/V SONNE from the ocean floor will be analyzed using a variety of different geochemical methods:

Volcanic and crustal rocks (e.g., lavas, volcaniclastics, gabbros): Ages will be determined by $^{40}Ar/^{39}Ar$ laser step-heating dating and U-Pb zircon dating. Major element geochemistry by X-ray fluorescence (XRF) and electron microprobe (EMP) will constrain magma chamber processes. Trace element data, obtained by inductively coupled plasma mass spectrometry (ICP-MS), will help to define the degree of mantle melting and help to characterize the chemical composition of the source. Phenocryst assemblages and compositions will be used to quantify magma evolution. Petrologic studies of the volcanic rocks will also help to constrain the conditions under which the melts formed. The composition of mafic basalts and basaltic glasses, as well as mafic melt inclusions, can be used to assess mantle temperatures at which melting took place, as well as pressures and degrees of melting. Radiogenic Sr, Nd, Hf and Pb (double spike) isotope ratios, determined by Thermal Ionization Mass Spectrometry (TIMS) and multi-collector ICP-MS, reflect the long-term evolution of the magma sources and thus serve as tracers to identify mantle and recycled crustal materials. O-isotopes provide a powerful tool for evaluating the role of crustal material in the magma source. Morphological and volcanological studies will constrain eruption processes, eruption environment and evolution of the volcanoes.

Mantle rocks (peridotites): Abyssal mantle peridotites are typically strongly altered (serpentinized) rocks. Bulk rock major element geochemistry by XRF, trace element geochemistry by ICP-MS and Sr-Nd-Pb isotope geochemistry by TIMS will constrain the extent of rock alteration and their elemental input in subduction zones. A study of relic primary minerals (pyroxenes, spinel) in these rocks by means of microanalytical techniques, namely, EMP for major elements and Laser-Ablation Inductively-Coupled Mass-Spectrometry (LA-ICP-MS) for trace elements will allow to reconstruct initial composition of these rocks prior to serpentinization, conditions of mantle melting (pressure range, degree of mantle melting, mantle permeability) and possible genetic relationships with associating crustal rocks. The methodological approach has been successfully applied in our studies of peridotites dredged during KALMAR SO201-2 cruise at the Stalamate FZ (Silantyev et al., 2012; Krasnova et al., 2013).

Non-magmatic rocks and Mn-Fe oxides yielded by dredging can be transferred to co-operating specialists for further shore-based analyses.

7.1.4 Biological Sampling

Shipboard Collecting Procedures

Biological material was collected by deployment of a geological chain bag dredge. In addition, four sediment trap tubes with a length of 21 cm and an inner diameter of 4 cm were placed inside the dredge to collect disturbed sediment samples from each site. Upon the dredge's arrival on deck, its contents were visually checked for collected macrofauna. The four sediment traps were removed and coarse sediments, pebbles, boulders, and rocks sampled with the dredge were inspected for encrusting benthic organisms.

Meiofauna

The fine sediment sampled using the four sediment trap tubes was immediately fixed in cold 6% formaldehyde prepared with buffer tablets for haematology (Merck # 1.09468.0100, pH 7.2). All samples were labeled and separately stored in Kautex jars (Kautex Textron GmbH & Co. KG, Bonn, Germany). For shipping, these plastic sediment containers were placed in

air-tight heavy duty plastic drums (Mauser-Werke GmbH, Brühl, Germany) or in aluminum boxes (ZARGES GmbH, Weilheim, Germany).

Macrofauna

Macrofaunal organisms identifiable either by naked eye or with a stereomicroscope were picked by hand or using scalpel blades and biological forceps. Depending on the intended investigation methods, specimens were either fixed in cold 100% ethanol, 4% formaldehyde solution prepared with buffer tablets (pH 7.2), RNAlater (Sigma-Aldrich # R0901), 4% paraformaldehyde solution prepared with buffer tablets (pH 7.2), or in a 50:50 mixture of acetone and methanol. All collected specimens were sorted to phylum level or lower and separately stored in plastic vials according to their size (2, 5, 50, 100, 200, 500, or 1,000 ml). Dead shells or skeletons were air-dried and later transferred to Whirl-Pak sampling bags (Sigma-Aldrich # Z527009). In select cases, specimens were photographed using a digital camera (DSC-HX400, Sony Corp., Tokyo, Japan).

7.2 ROCK SAMPLING REPORT AND PRELIMINARY RESULTS OF BATHYMETRIC MAPPING

The following section mainly gives background information and short summaries of the features sampled and/or mapped on SO-249 and on the rock types obtained by dredging but also presents some preliminary interpretations of bathymetric data and rock assemblages. Refer to Appendix I and II for exact latitude, longitude, and depth of dredge sites and more detailed rock descriptions. Figure 3.15 shows an overview map with all SO-249 sampling sites. Distances, dimensions and heights given in this chapter are approximate and are only included to give a rough idea of dimensions of morphological features. Distances between seamounts are given between the seamount tops. All photos shown in this chapter are taken by GEOMAR. All overview maps are based on "The GEBCO_2014 Grid, version 20150318".

7.2.1 Arc Input (Fracture Zones, Emperor Seamounts, Seamounts on Pacific Plate)

F. Hauff, R. Werner

This chapter summarizes dredging operations to characterize subduction input to the Aleutian – Kamchatka arc systems derived from the Pacific Plate. The sub-chapters categorize the sampled features by Fracture Zones, Emperor Seamounts and other Intraplate Seamounts.

Amlia Fracture Zone (DR2–4) and Bend Fault (DR5)

The Amlia Fracture Zone (FZ) is the easternmost of the N-S trending FZ's sampled during SO-249. They all show left lateral offsets of seafloor magnetic anomalies and the Amlia FZ displaces chron 29 (~65 Ma) ocean crust in the East from chron 25 (~56 Ma) ocean crust to the West. Predicted bathymetry indicates that the relief of the Amlia FZ is most pronounced at its northern termination where it enters the Aleutian trench (Fig 7.5). Therefore dredging focused at the N-S striking ridge, located on the western side of Amlia (Fig 7.6). Successful dredging proved difficult with limited quantities of rocks being returned by DR2 and DR3 along the NE tip of the ridge while DR4 along the upper section of the western slope was empty. DR2 recovered a large bloc of freshly broken breccia that amongst others contains cm sized clasts of igneous rock (diabase) that could be used to characterize the magmatic portion of the ocean crust. The breccia probably reflects solidified slope talus. Slightly Ol-Plg-Px and Plg-Px phyric lava fragments were obtained in DR3 (Fig 7.7) and were considered suitable for geochemistry and age dating. Additional igneous lithologies include intrusive rocks, metasediments, some of which are described as tuffs of unknown origin and continental type sandstones. The latter (DR3-11) has been speculated to be related to the Zodiac Fan, a large pile of Alaskan derived sediment further East.

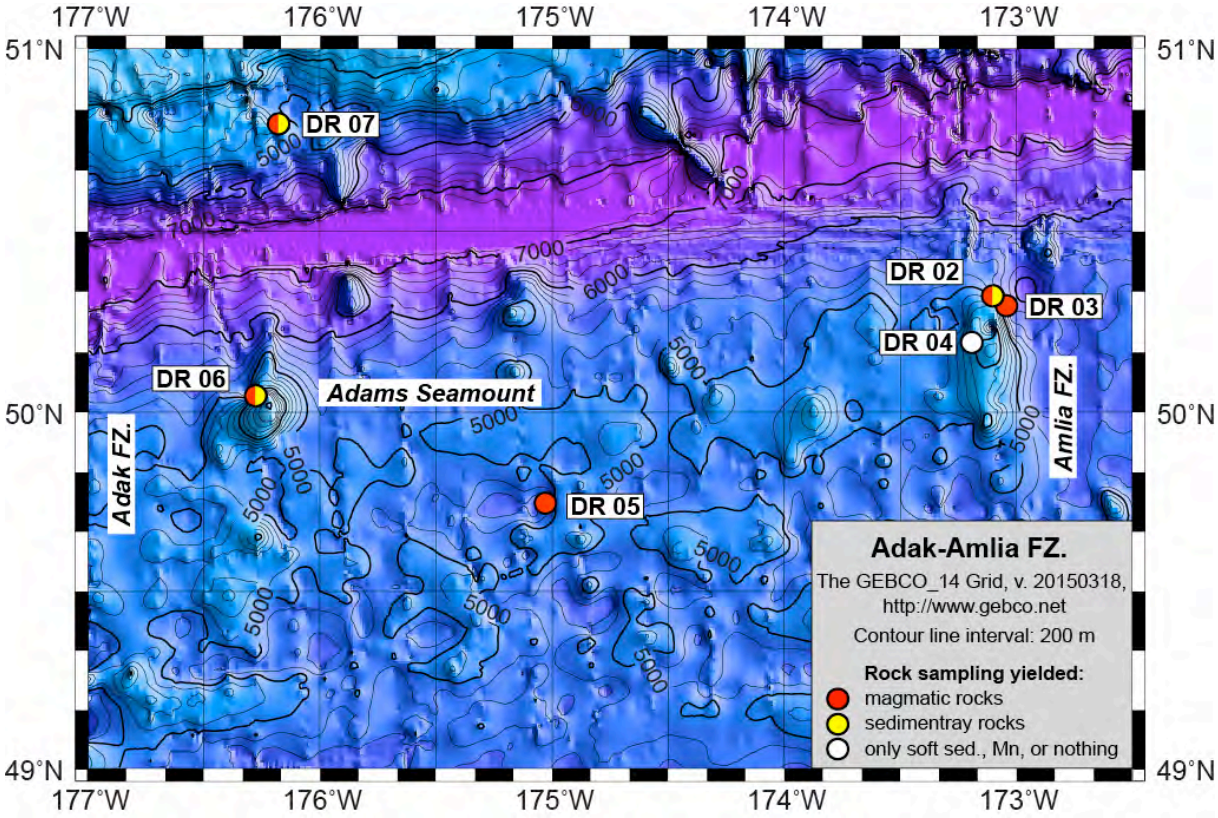


Fig. 7.5.: Overview map showing seafloor between Amlia and Adak FZ's immediately south of the Aleutian trench (>7,000 m b.s.l). Note E-W striking ridge-valley topography in-between the FZ's, interpreted to reflect bend faults that reactivate the abyssal hill pattern of the ocean floor originally formed near the spreading axis. Adams Seamount (DR-6) is the largest circular shaped intraplate volcanic feature in this area and summarized in chapter "Other Intraplate Seamounts".

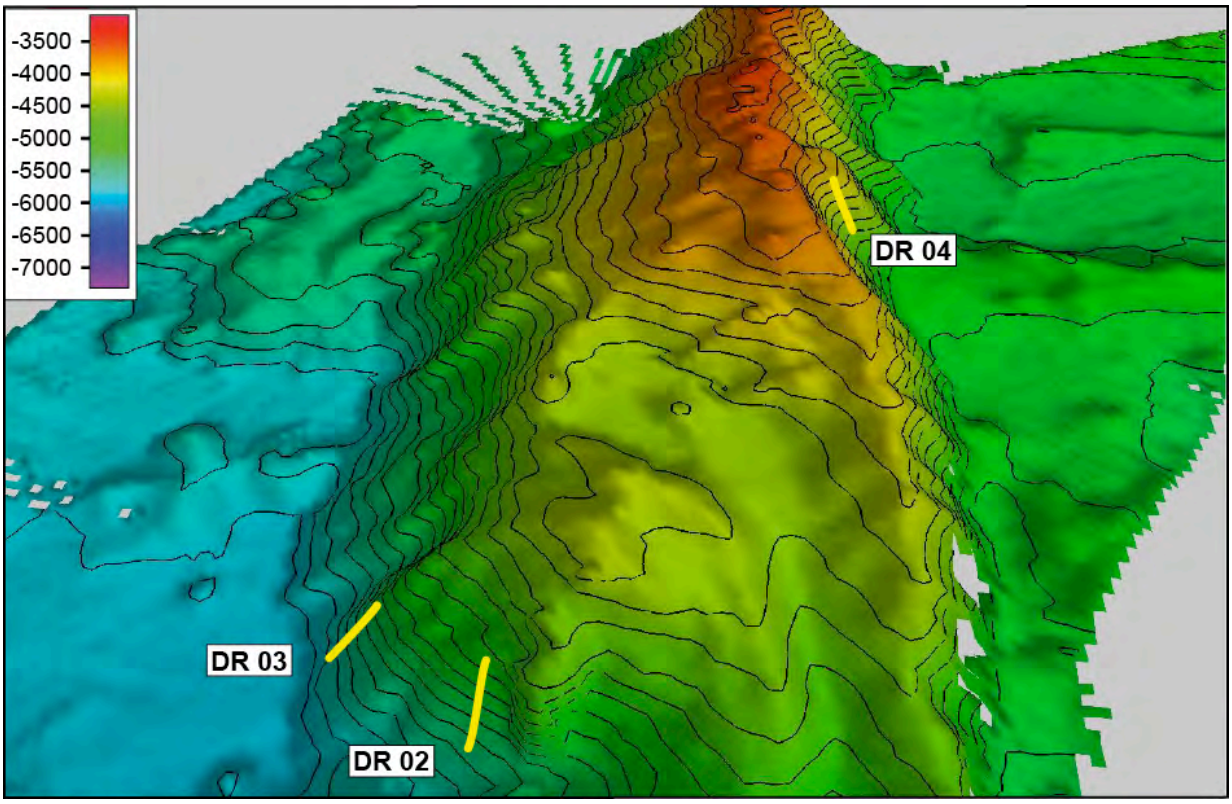


Fig. 7.6: Pronounced northern termination of the Amlia FZ (view from NNW to SSE). The map is based on multi-beam data recorded on SO-249 (stereo exaggeration: 2x; interval of contour lines: 100 m).

Mapping of bend faults between Amlia and Adak FZ revealed very limited opportunities to dredge based on steepness of slopes. DR5 obtained a few but petrographically homogeneous Plg ±Ol phyric lava fragments (Fig. 7.8 and 7.9) that despite their overall medium degree of low temperature groundmass alteration appear acceptable for bulk geochemistry and separation of Plg phenocrysts for age dating.

Fig. 7.7: Fairly fresh, slightly Olivine - Plagioclase phyric lava from Amlia FZ.

Fig. 7.8: Moderately altered Plagioclase - Olivine phyric pillow fragment with chilled margin that contains fresh glass in places. Recovered from bend fault between Amlia and Adak FZ.

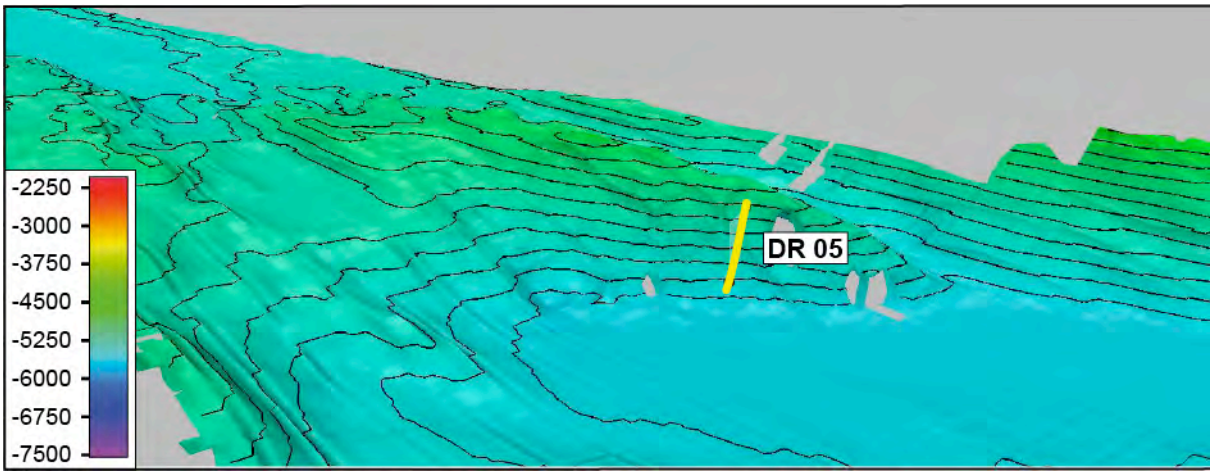


Fig. 7.9: Bend fault between Amila and Adak FZ with dredge track DR5 (view from NW to SE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Rat Fracture Zone (DR20–24)

The Rat FZ is morphologically the most expressed among the N-S striking FZ's south of the Eastern Aleutians. Its intersection with the Aleutian trench coincides with a change in strike of the trench and islands from E-W in the East to NW-SE further West. Magnetic anomalies E of Rat strike E-W and imply ~56Ma crust while W of Rat magnetic anomalies rotate into an orthogonal strike with respect to the Aleutian trench covering chron 23 to 19 (~52-41 Ma) ocean crust. Predicted bathymetry reveals a complex pattern of three N-S trending ridges separated by valleys and SW-NE trending basins E and W of Rat (Fig. 7.10). While the eastern of these basins connects with the Rat FZ in the southern part of the working area, the western of the SW-NE striking valleys terminates at the central N-S ridge related to the Rat FZ. More detailed mapping and sampling is needed to unravel the kinematics of the Rat FZ in

this particular area. In terms of rock sampling, stations along ±E-W oriented scarps were most successful and exposure of magmatic basement is interpreted to reflect recent faulting related to the bending of the down going plate along the outer rise (Fig. 7.11).

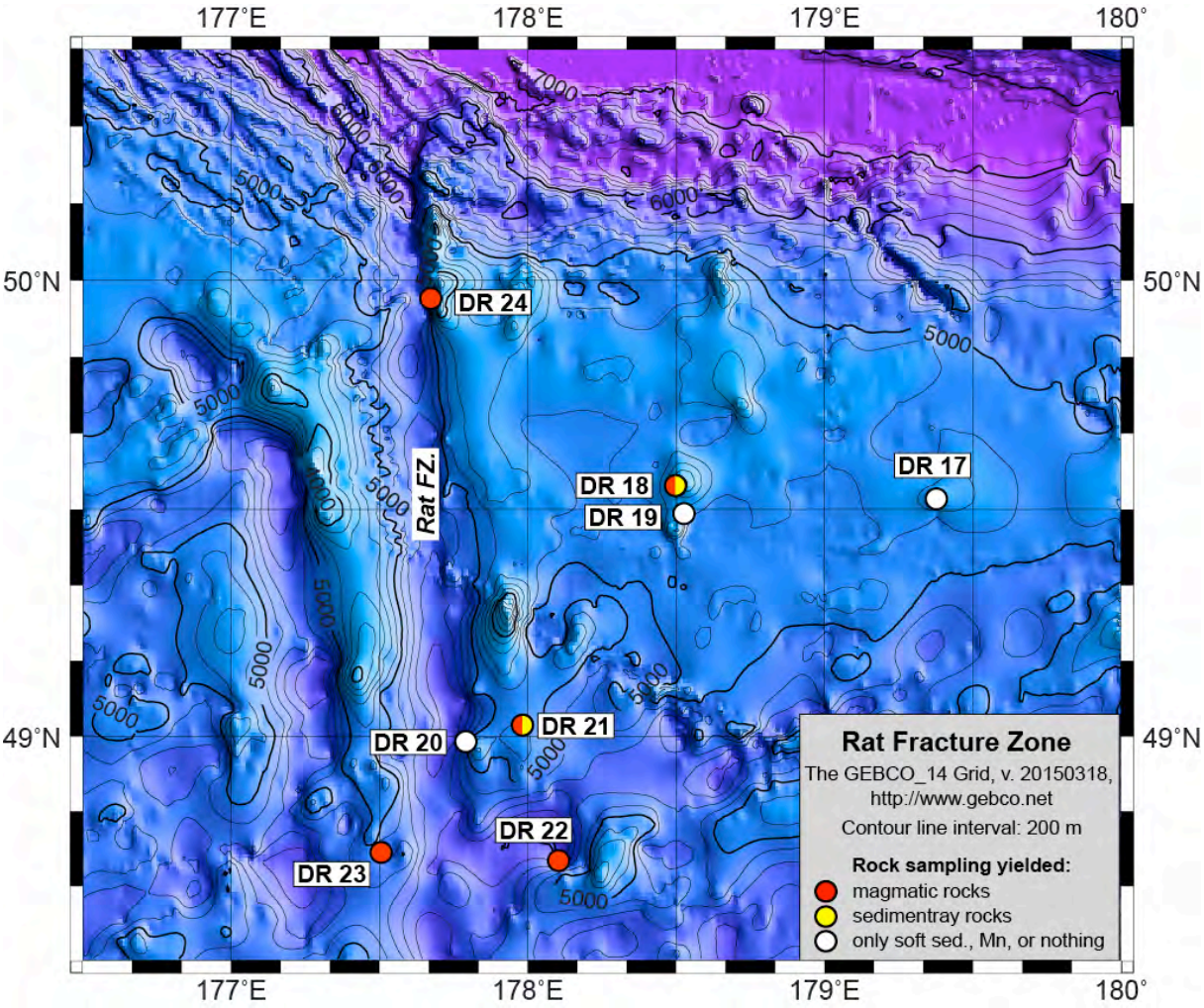


Fig. 7.10: Overview map of Rat FZ and corresponding dredge sites DR20 through DR24. DR17 through DR19 are intraplate seamounts summarized in chapter "Other Intraplate Seamounts".

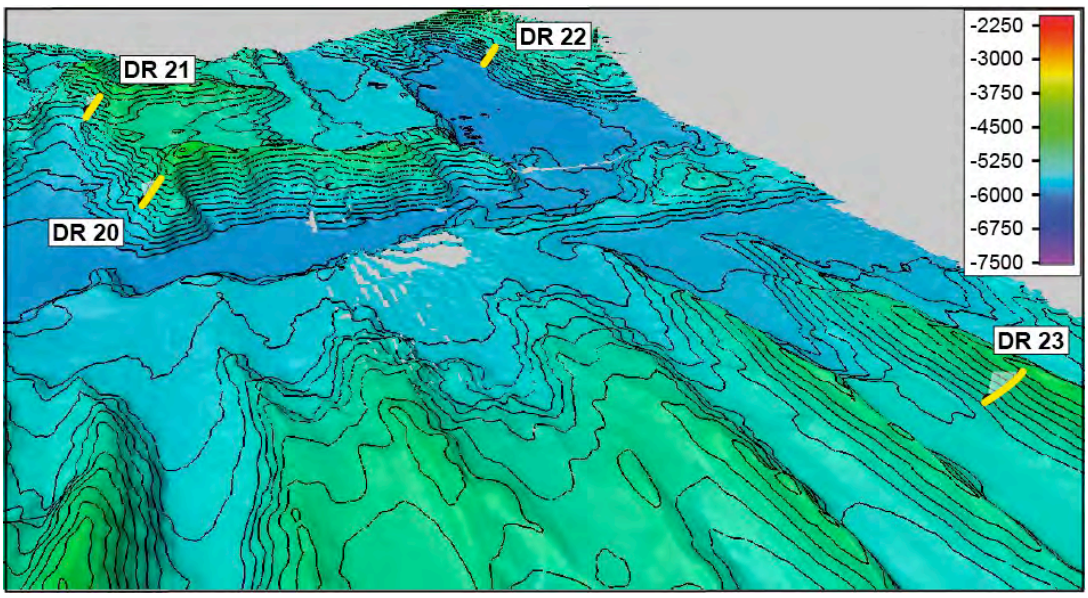


Fig. 7.11: Dredge stations DR20 - 23 at Rat FZ (view from WNW to ESE). Stereo exaggeration, contours, and data sources as in figure 7.6.

The most successful dredges in terms of in-situ igneous rocks were carried out at DR22 (Plg ±Ol phyric lava, Fig. 7.12) and DR24 (aphyric and Plg-Px phyric lava, Fig. 7.13 and 7.14). Most samples are in acceptable states of alteration and the Plg phyric lavas could potentially be dated. Heterogeneous lithologies with single samples of altered Ol-basalt, volcaniclastics, siliceous tuff and diorite as recovered in DR21 need to be treated with extreme caution for further processing since at least the latter two lithologies could represent ice rafted material. DR23 opposite of DR22 on the W side of Rat FZ (Fig. 7.11) also provided a heterolithological dredge but fairly fresh Ol-phyric lava fragments within a freshly broken Mn-crust which therefore are clearly in-situ and freshness appeared suitable for geochemical analysis.

Fig. 7.12: Plagioclase ± altered Olivine phyric lava from Rat FZ.

Fig. 7.13: Aphyric lava with minor alteration from Rat FZ.

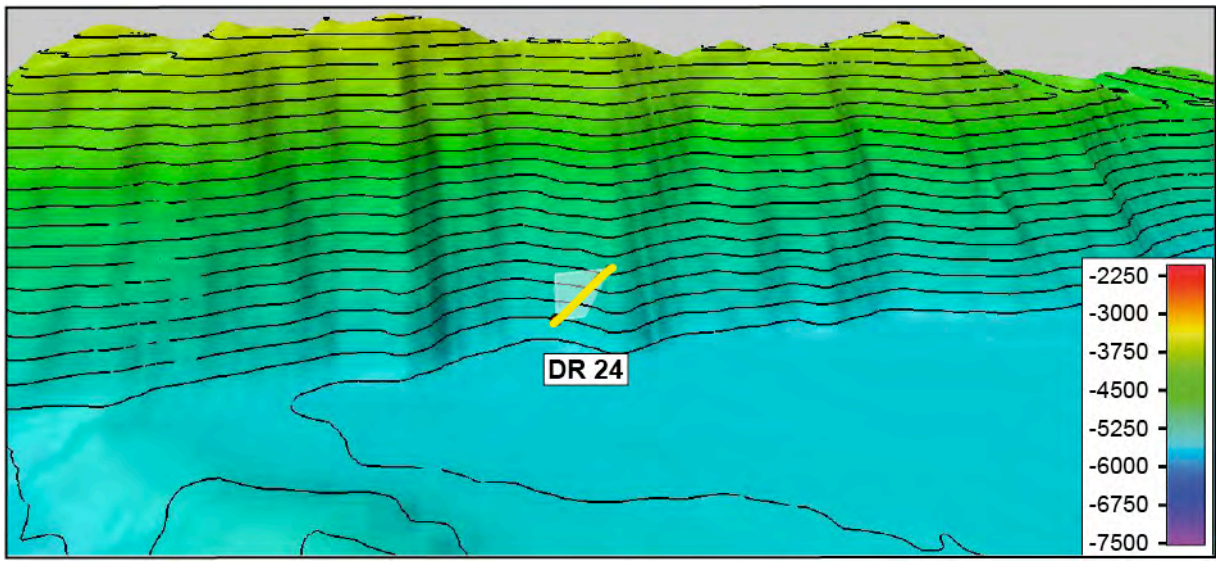


Fig. 7.14: Dredge station DR24 at Rat FZ (view from WNW to ESE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Stalemate Fracture Zone (DR45–47, DR53–DR61)

The Stalemate FZ is morphologically the most prominent of all FZ's entering the Aleutian trench (Fig. 7.15). In contrast to the N-S trending FZ's along the eastern portion of the arc, Stalemate runs slightly oblique to the trench reflecting rotation of magnetic anomalies orthogonal to the trench W of 177°30'E and thereby unintentionally mimicks the westward increase to right lateral strike slip along the plate boundary. At ~169° 45'E the Stalemate ridge

bends towards NNW before it diminishes into the trench. Notably two indents in the lower fore-arc basement are observed immediately SE of where Stalemate interferes with the plate boundary (~69° 30'E). In theory the morphological retreats of the lowermost fore-arc basement may have been caused by indention of the leading tip of Stalemate when it migrated highly oblique along the plate boundary towards the NW. Ages of the ocean crust W of Stalemate are inferred to be Cretaceous to Jurassic while to the East the fossil Mid Eocene Kula spreading center is exposed at 171°05'E over a short stretch before it terminates in the trench (Londsdale 1988).

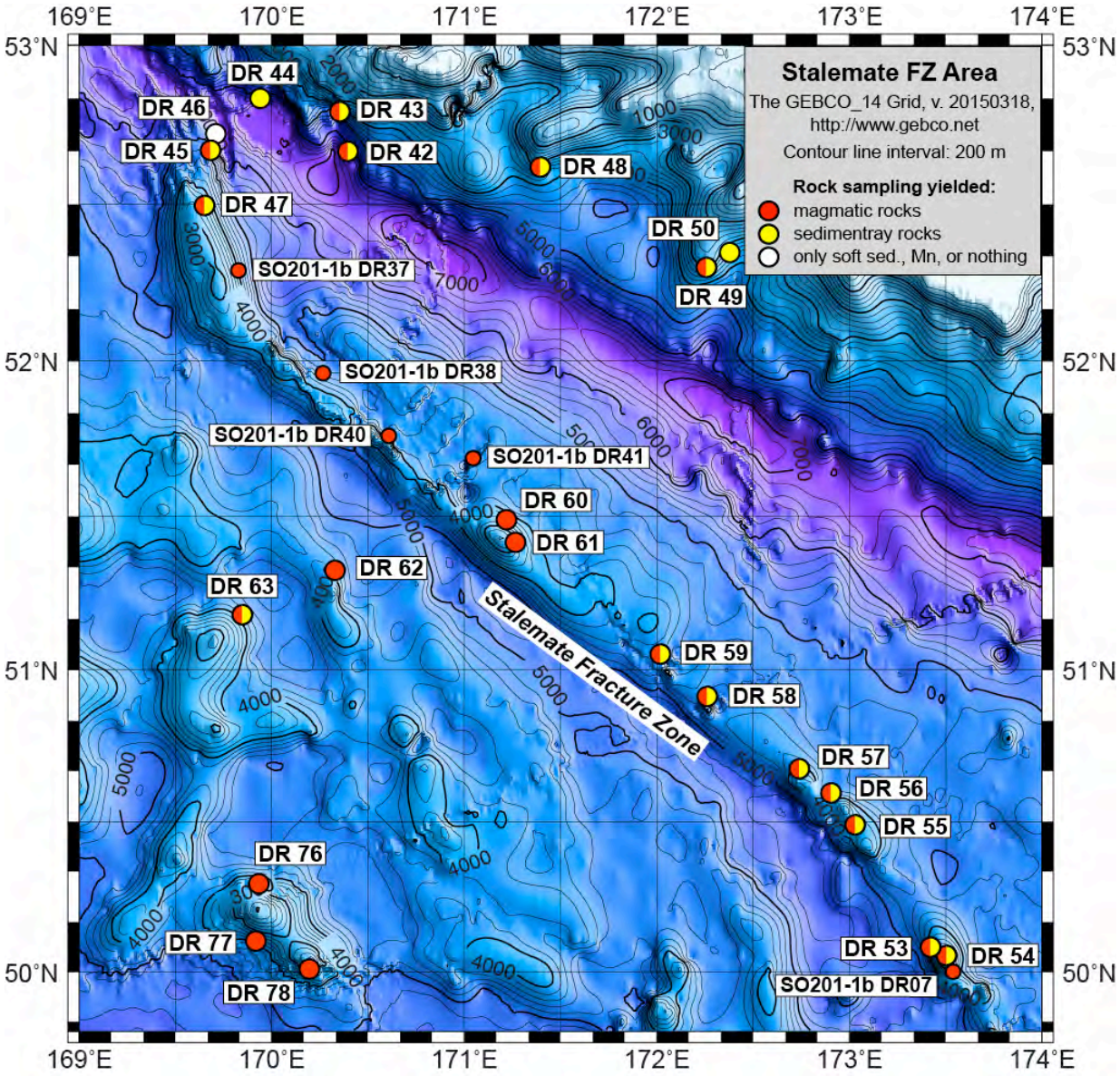


Fig. 7.15: Overview map of Stalemate FZ (DR45-47 and DR54 – 61) along with SO-201-1b sampling sites. Also shown are SO-249 sampling sites in the lower fore-arc (DR42-44), Canyons south of Attu (DR49 – 50) and intraplate volcanic features on the ocean crust west of Stalemate (DR62 - 63 and DR76 – 78) covered in chapter "Other Intraplate Seamounts".

The northwestern most part of the Stalemate FZ (169°45'E to 171°05'E) and a single site at 173°35'E have been subject to multi-beam mapping and reconnaissance dredging during SO201-1b in 2009 (Fig. 7.15). Preliminary results have been published in Silantyev et al. (2012, 2014) and Krasnova et al. (2013).

Station work during SO-249 aimed at mapping and sampling of the Stalemate FZ from its northwestern termination to 173°30'E, the southeastern most sampling location of SO-201-1b. DR45 through DR47 targeted the NW tip of Stalemate, a region with the steepest relief from 2,400 to more than 6,900 m b.s.l. within 7.5 km (Fig. 7.16). While DR46 returned empty as it

got stuck at the very beginning of the track along the base of the NE dipping slope, DR45 at mid section of the NE flank and DR47 in the fault dissected top region provided a bonanza of rocks varying from partially serpentinized mantle rocks (Fig. 7.17) to gabbros, diabases and lavas.

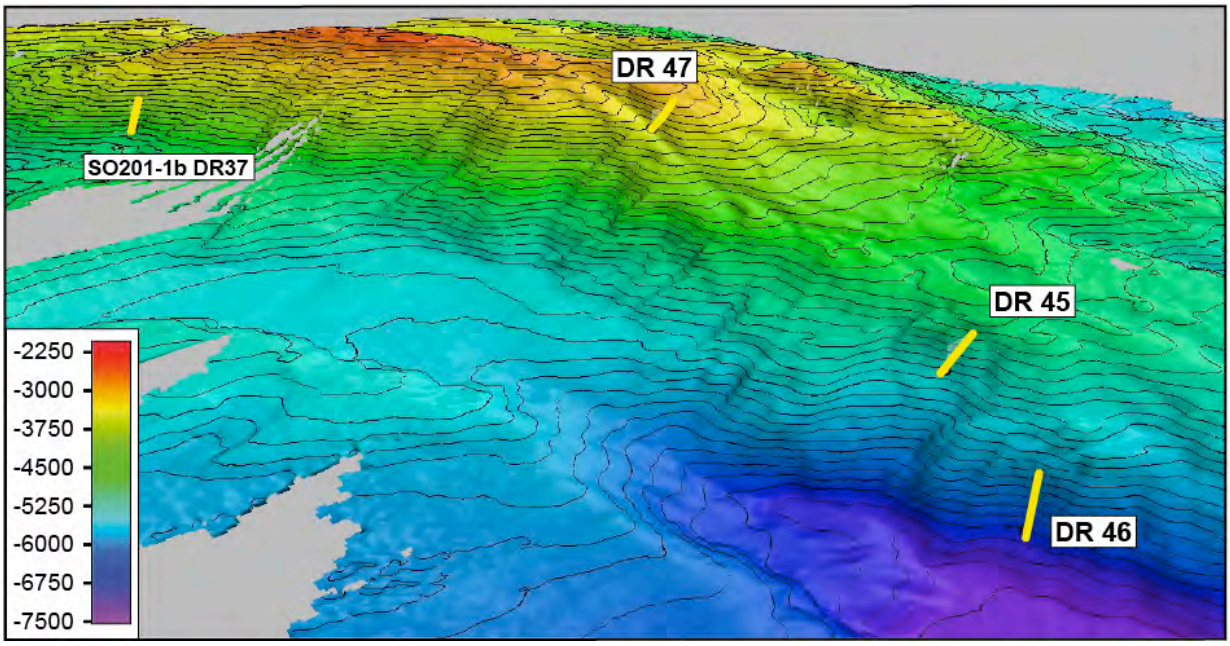


Fig. 7.16: Northwestern termination of Stalemate FZ with SO-249 dredge sites DR45 - 47 and SO-201-1b dredge DR37 (view from ENE to WSW). Exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.17: Serpentinized harzburgite from mid slope at northwestern termination of Stalemate FZ.

Fig. 7.18: Websterite consisting of altered Olivine + Orthopyroxene + Clinopyroxene recovered from the shallowest part of Stalemate FZ at its northwestern termination.

DR45 delivered polymict breccias with angular clasts of igneous and metamorphic rocks. Following the standard lithostratigraphic subdivision of ocean crust they include 1) serpentinized peridotites (harzburgites, Fig. 7.17), 2) pyroxenites, 3) gabbro, 4) dolerites and diabases (= possible dikes) and 5) Ol -phyric, Plg-phyric basalts / diabases. Finally amphibolite with an unknown protolith was also collected and may represent the metamorphic sole of the Stalemate complex formed during collision of the ridge with the Aleutian trench.

Fig. 7.19: Moderately altered gabbro containing Plagioclase (>50%), Clinopyroxene (~30%) and, Orthopyroxene (~5%) and secondary Chlorite and Actinolite. (Stalemate FZ).

Fig. 7.20: Slightly Pyroxene phyric lava pebble recovered from conglomerate that is interpreted to have formed as beach deposit when this part of the Stalemate FZ was an ocean island.

DR47 carried out along a N-S striking fault scarp in the top region recovered abundant well solidified conglomerates and sandstones along with separate pebbles and sub-angular fragments of igneous rocks. The igneous lithologies are dominated by websterites and pyroxenites (~60-70%) followed by gabbro (~10-15%) including tectonized varieties and basaltic pebbles (Figs. 7.18 - 7.20). A key observation is that lithologies present in the conglomerate as angular blocs, pebbles and smaller grains are all identical, indicating an *in-situ* origin of the conglomerate in a high energy, fluvial environment such as a beach. This observation is consistent with the hypothesis that the northern part of the Stalemate FZ was once exposed above sea level (Silantyev et al. 2012). It should be explored if the age of the beach deposits could be dated by fossils in order to decipher if uplift of mantle and deep crustal rocks above sea level was related to the recent collision of Stalemate with the Aleutian trench or occurred when this part of Stalemate was a mid Eocene(?) transform fault.

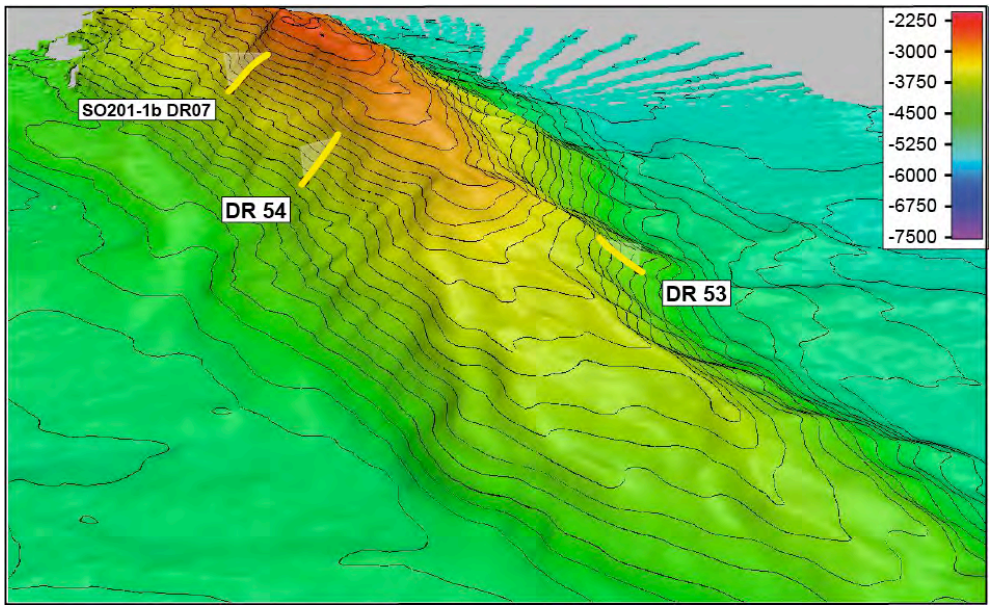


Fig. 7.21: Southeastern termination of Stalemate FZ with SO-249 dredge sites DR53 - 54 and SO-201-1b dredge DR7 (view from N to S). Stereo exaggeration, contours, and data sources as in figure 7.6.

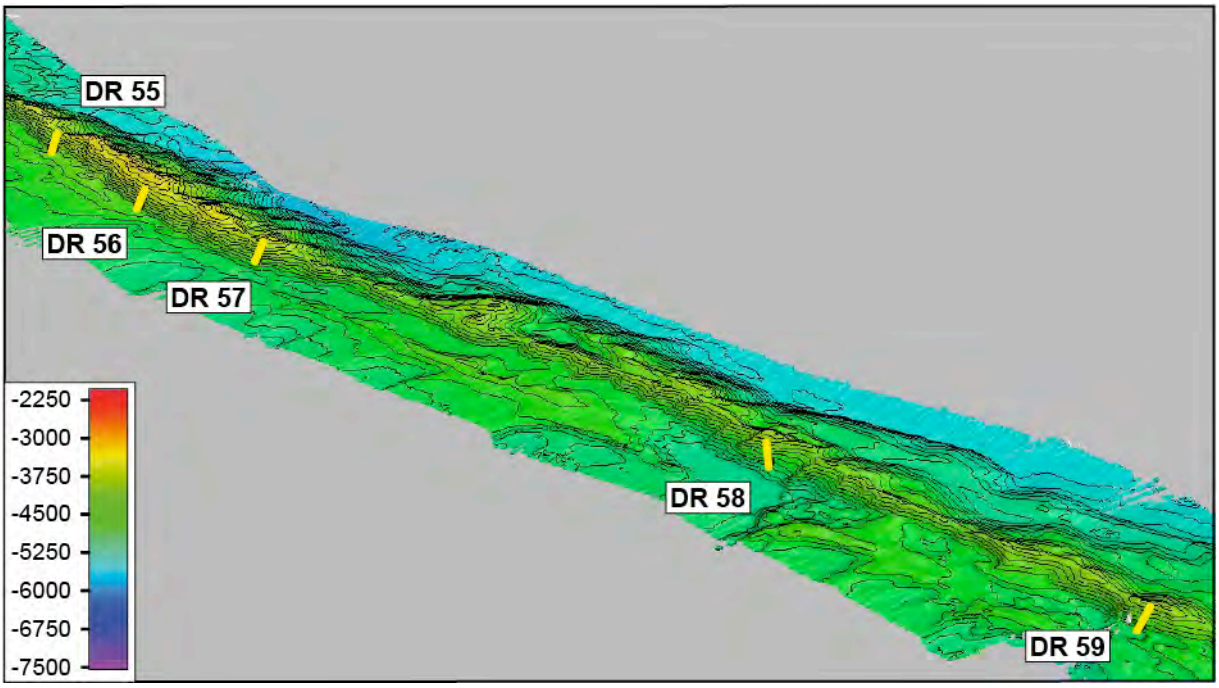


Fig. 7.22: Central section of Stalemate FZ with SO-249 dredge sites DR55 - 59 (view from N to S). Stereo exaggeration, contours, and data sources as in figure 7.6.

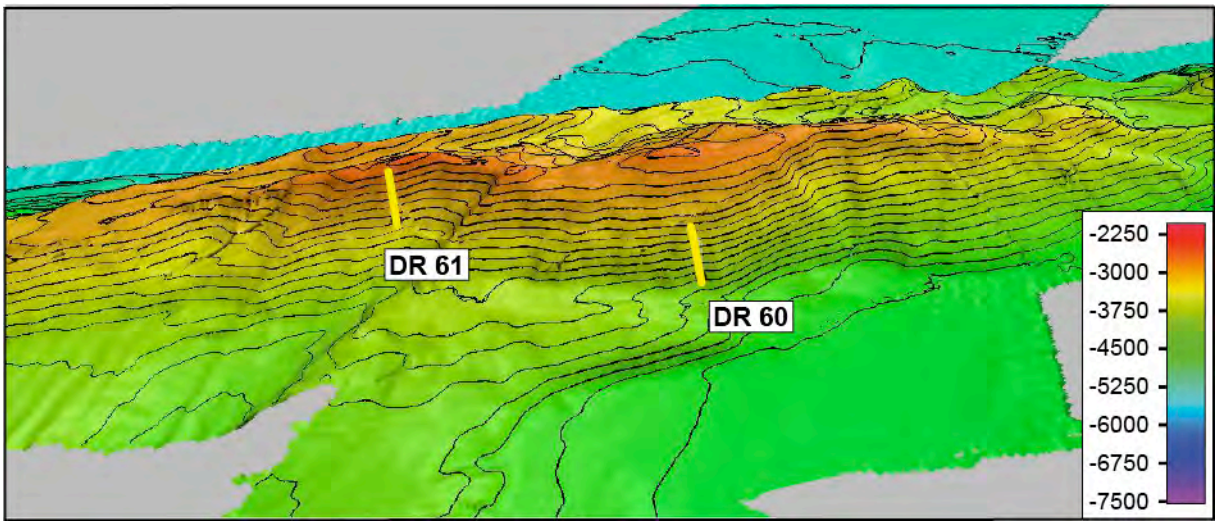


Fig. 7.23: Central section of Stalemate FZ with SO-249 dredge sites DR60 and 61 (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

The southeastern portion of Stalemate was sampled between DR53 and DR61 (Figs. 7.21 - 7.23). Here the FZ consists of three separate ridges with areas of less pronounced relief in-between before it becomes a continuous, elevated ridge from the DR60 area onwards until its NW termination. Igneous rocks obtained in DR53 through DR55 were Plg phyric and aphyric lava and diabase fragments ranging from slightly to medium altered (Fig. 7.24). Plg phenocrysts appear suitable for Ar-Ar dating. Sediments included sand and mudstones. In addition ice rafted rocks were identified in DR55 based on the occurrence of Amphibole. DR56 gave only very few rocks among them two sub angular Plg phyric lava fragments of unclear provenance. DR57 provided large Mn crust along with a few angular fragments of aphyric lava considered to be insitu and suitable for geochemical analysis. In addition small fragments of plutonic rocks described as gabbro-norite were found. Igneous rocks of predominantly doleritic / diabasic and gabbroic origin were obtained in DR58 and were found of good to acceptable quality.

Fig. 7.24: Fairly fresh diabase from southeastern end of Stalemate FZ working area.

Fig. 7.25: Moderately altered Plagioclase phyric lava from the central part of the Stalemate FZ working area.

Only three aphyric lava fragments together with Mn crust, sediments and larger ice rafted volcanics were delivered by DR59. Brecciated and hydrothermally overprinted diabases were brought up by DR60 while DR61 provided thick Mn crusts with fragments of Ol-Plg phyric pillow basalts (Fig. 7.25) with one fragment having fresh glass preserved. In addition a large bloc of breccia with fragments of gabbro and possible dolerites was contained. In summary the igneous rock inventory of Stalemate covers the full range of ocean crust lithologies in its northwestern half presumably due to extreme vertical uplift, whereas igneous rocks in the southeastern 2/3 of the working area are dominated by aphyric and Plg phyric lava along with subvolcanic varieties and very minor occurrences of plutonic rocks.

Krusenstern (DR85–90), N.N. Fracture Zone (DR100–101), and basins in-between (DR91, DR94–99)

The NW-SE striking Krusenstern and N.N. FZ's are located west of the Emperor Seamounts (Fig. 7. 26) on presumably Jurassic-Cretaceous ocean crust; the oldest seafloor in the Northern Pacific. Both FZ's are subducted ± orthogonal beneath Kamchatka and possibly enhance contributions from altered ocean crust and serpentinized mantle to the arc system. Seismic reflection surveys across both FZ's have been carried by "Bundesanstalt für Geowissenschaften und Rohstoffe" (BGR) in the framework of the KALMAR project during SO201-1a in 2009. These data showed that despite the Mesozoic age of the crust, expectedly thick sediment coverage and distance to the Kamchatka trench and associated bend faulting, igneous basement may outcrop in places. In addition a series of WNW-ESE striking oval shaped, presumably pull-apart, basins in-between N.N. and Krusenstern FZ were also targeted in hope of igneous basement exposures (Fig. 7. 26). Their formation mechanism as pull-apart depressions is however unclear as no such features can form in-between transform faults and therefore appear more likely to be an expression of younger intraplate deformation or re-organization of nearby spreading centers.

Dredging in the southeastern portion of Krusenstern (Figs. 7.27 and 7.28) proved difficult due to the lack of steep morphology so that DR85 returned only soft sediment and a few dropstones while DR86 was empty. DR87 returned a fairly homogeneous dredge of medium altered aphyric ocean floor lavas that comprises pillows and pillow fragments along with greenish-yellowish hyaloclastite of which some may contain fresh glass. A single Mn encrusted lava fragment contained few % of Plg phenocrysts which may be suitable for Ar-Ar dating. Medium to more strongly altered Ol-Plg phyric lava fragments were obtained at DR88 along the northeast facing slope of Krusenstern. In this area a north trending fault coming from the Emperor Seamounts connects with Krusenstern and may have shaped the steeply dipping

northeast slope. In addition a series of significantly fresher Plg-Px phyric rocks were also recovered but a dropstone origin was assigned. On the last station of Krusenstern (DR90), medium altered Ol-phyric and Ol-Plg phyric lava fragments were obtained (Fig. 7.29). Freshness and amounts of Plg were considered suitable for age dating.

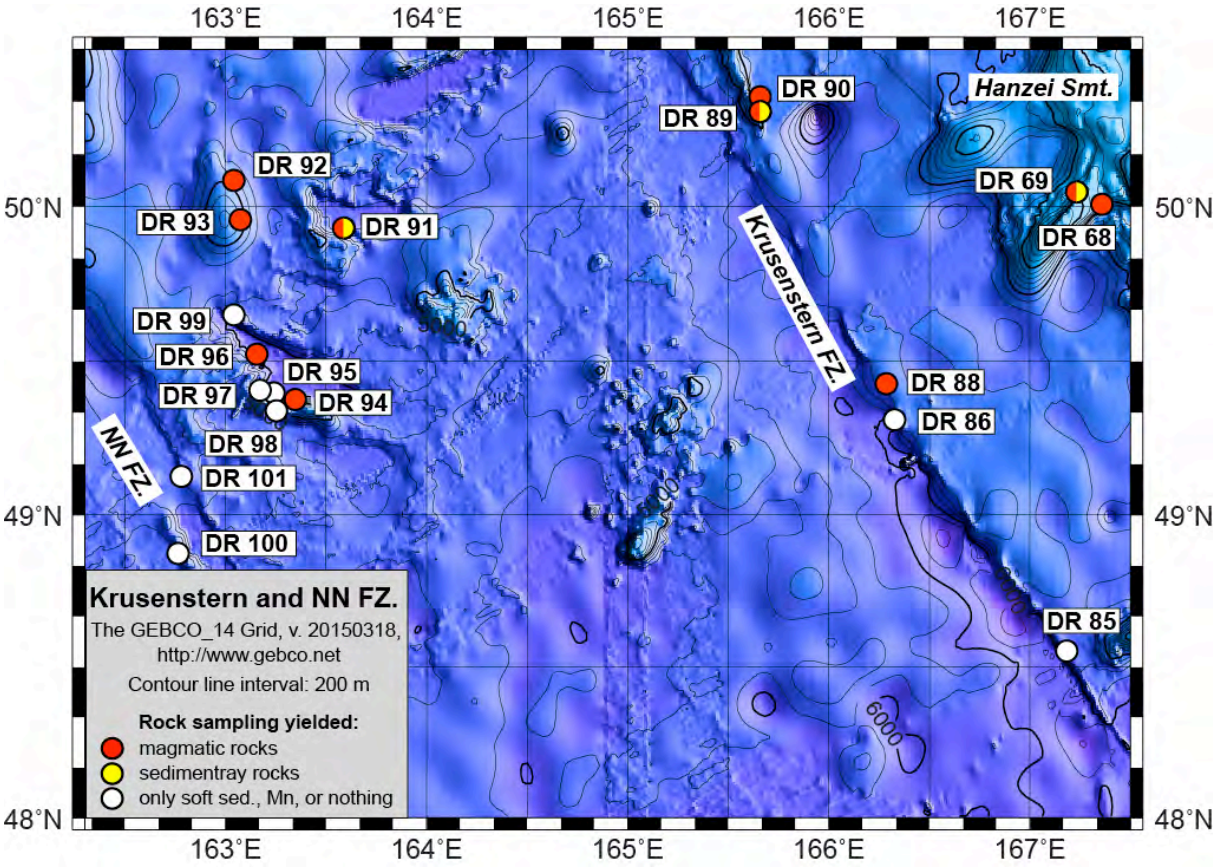


Fig. 7.26: Overview map of Krusenstern and N.N. FZ's (DR85 – 90 and 100 – 101) southwest of Hanzei Seamount. Also shown are a series of presumably pull-apart basins (DR91 and DR94 – 99). An intraplate seamount was sampled at DR92 – 93 and treated in chapter "Other Intraplate Seamounts".

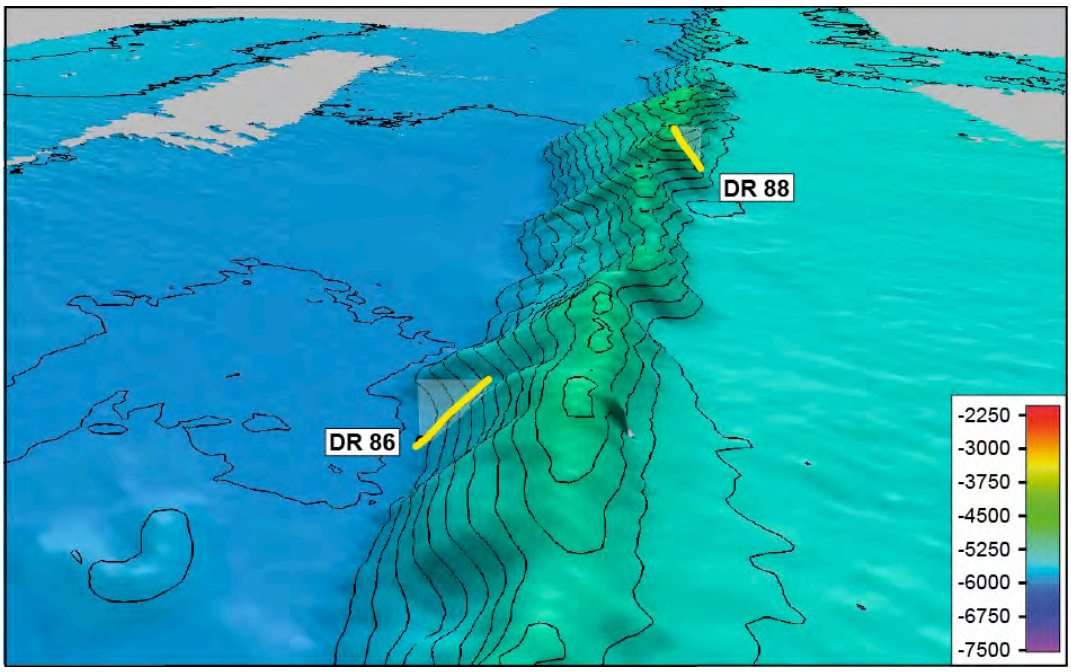


Fig. 7.27: Southern section of Krusenstern FZ with SO-249 dredge sites DR86 and 88 (view from SE to NW). Station 87 was a CTD deployment, dredge site DR85 is shown in figure 7.XX. Stereo exaggeration, contours, and data sources as in figure 7.6.

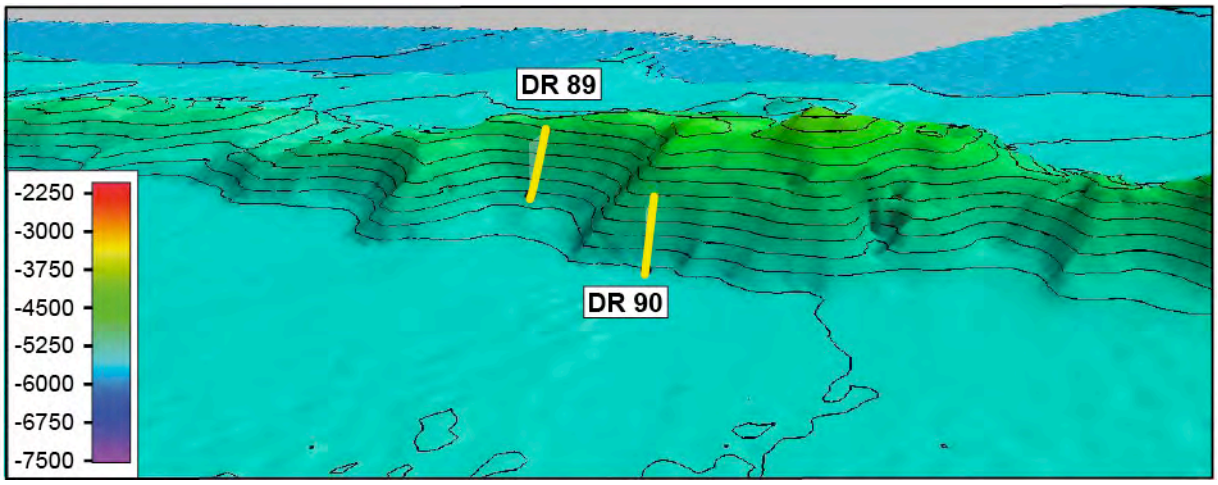


Fig. 7.28: Dredge sites DR89 and 90 at Krusenstern FZ (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.29: Olivine-phyric lava from Krusenstern FZ. Olivine is altered and groundmass oxidized in most places.

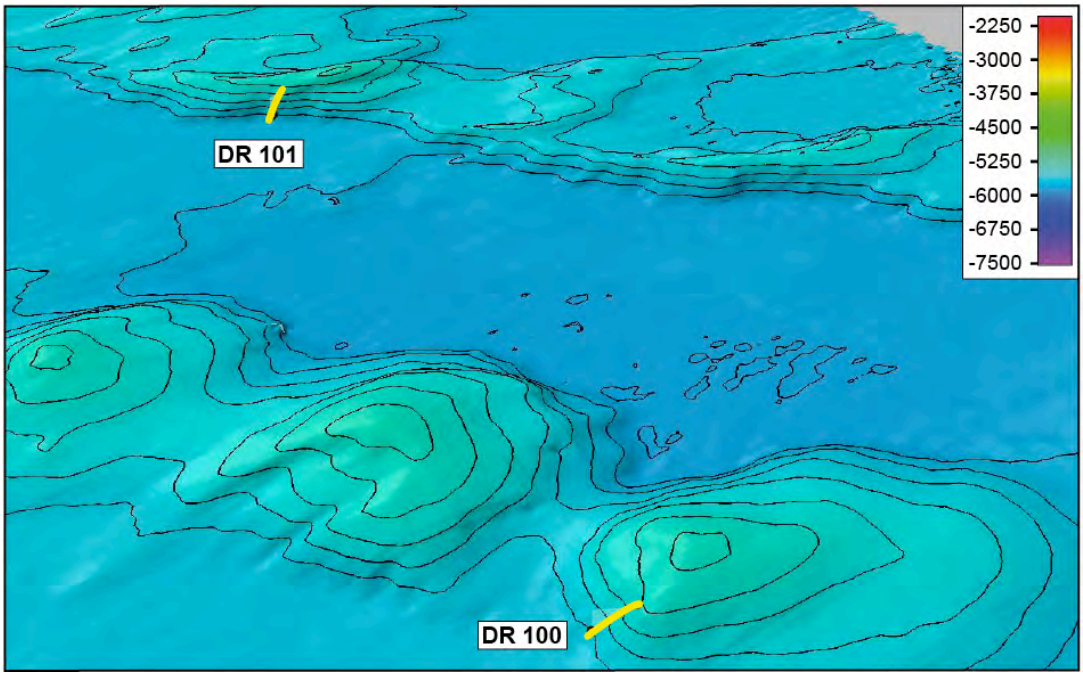


Fig. 7.30: Dredge sites DR100 and 101 at N.N. FZ (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Two unsuccessful dredges (DR100 – 101, Fig. 7.30) were carried along the N.N. FZ reflecting the smooth, presumably sediment covered topography. The series of seemingly pull-apart basins (Figs. 7.31 and 7.32) cutting into the ocean crust in-between Krusenstern and N.N. FZ's were especially targeted along the southern margin of the central basin as it is bounded by a ridge with very steep slopes and multiple offsets (Fig. 7.32). However, dredging proved extremely difficult with only two (DR94 and 96) out of six dredges providing very limited amounts of unquestionable *in-situ* igneous rocks. They include relatively fresh Ol-Px-Plg phyric diabases at DR94 (Fig. 7.33) and aphyric lava fragments recovered from a Mn-crust at DR96. The other stations were either empty (DR98 and 99) or contained igneous material of uncertain origin (DR95 and 97).

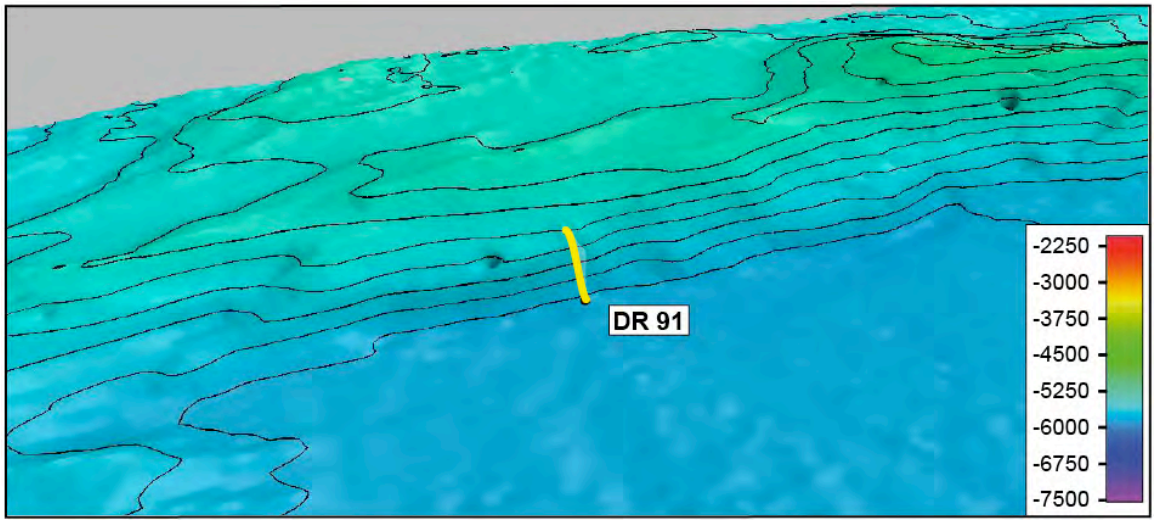


Fig. 7.31: Dredge sites DR91 at seemingly pull-apart basins cutting into the ocean crust in-between Krusenstern and N.N. FZ's (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

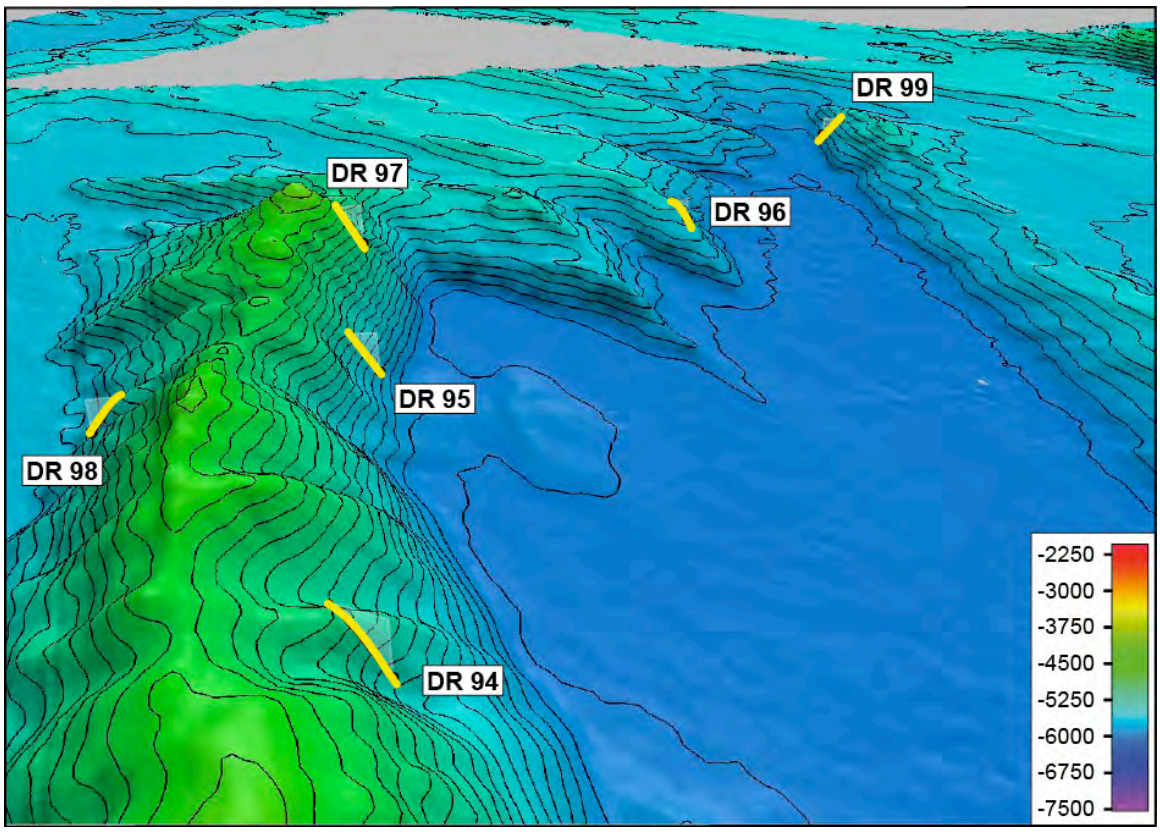


Fig. 7.32: Dredge sites DR94 - 99 at a pull-apart basin east of N.N. FZ (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.33: Moderately altered Olivine-Pyroxene-Plagioclase phyric lava recovered from a pull-apart basin northeast of N.N. FZ.

Emperor Seamounts (DR65–75, DR79–84)

The Emperor Seamounts are the most prominent bathymetric feature on the ocean floor of the Pacific northwest. They strike NNW from the Hawaiian-Emperor bend towards Kamchatka before turning NW in the vicinity of the Aleutian-Kamchatka trench intersection to become subducted beneath Kamchatka (Fig. 6.1).

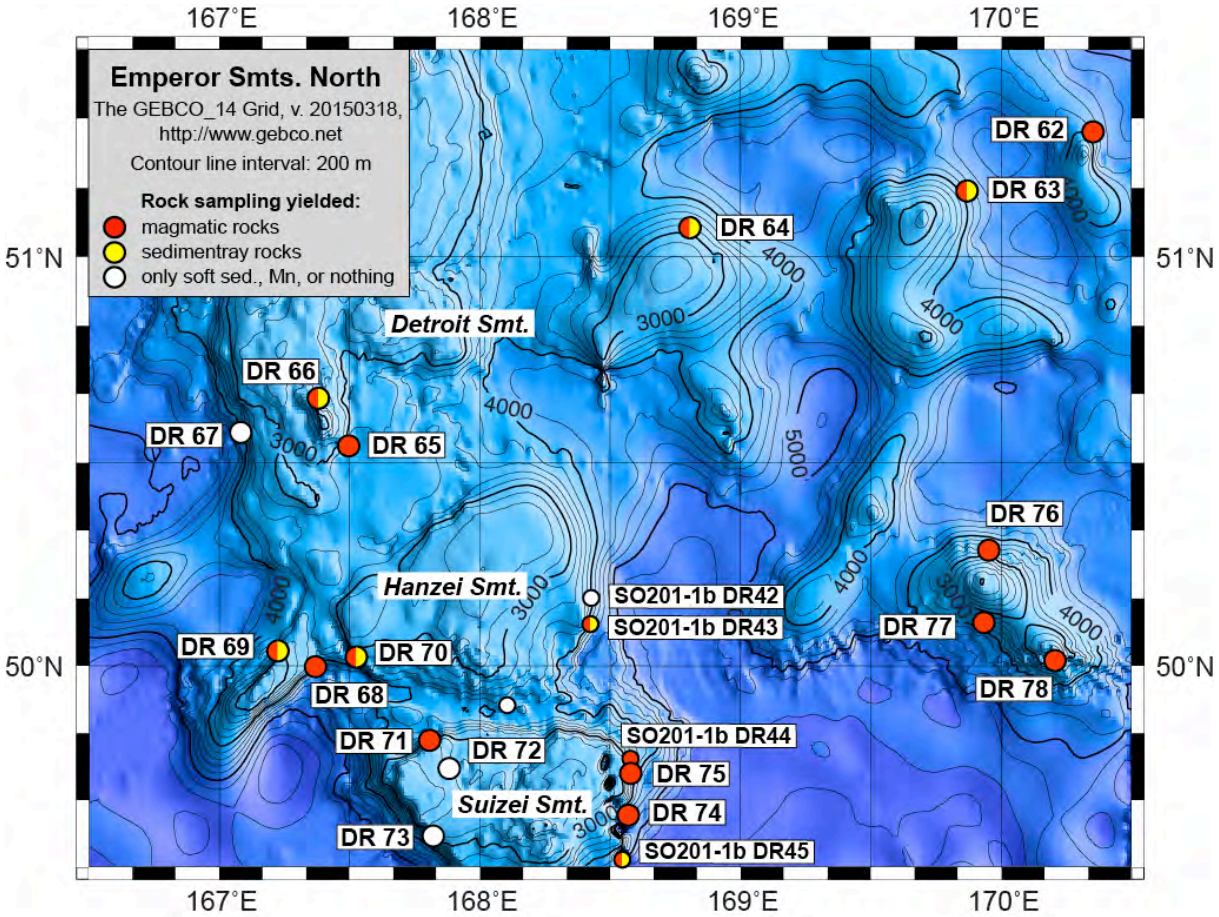


Fig. 7.34: Overview map of the northern SO-249 work area of the Emperor Seamounts along with stations of SO201-1b. Stations east of the Emperors are treated in chapter "Other Intraplate Seamounts"

The SO-249 work area includes the northernmost seamounts Tenji, Suizei, Hanzei and

Detroit (Figs. 7.34 and 7.35). They are believed to form the older part of the Hawaiian hotspot track (~60 to ~80 Ma). Age progressive volcanism in this area, however, is only weakly established due to the lack of published age data (71Ma for Tenji; 76 and 81 Ma biostratigraphic ages for Detroit). Overall dredging of the Emperor Seamounts turned out to be extremely challenging due to intense manganese encrustation of slopes and abundant dropstones. Still in a few places *in-situ* rocks could be obtained that serve as an important contribution to place tighter age and compositional constraints for this part of Hawaiian hotspot track when the plume was located near or underneath a spreading ridge giving rise to larger extends of plume melting than is presently the case.

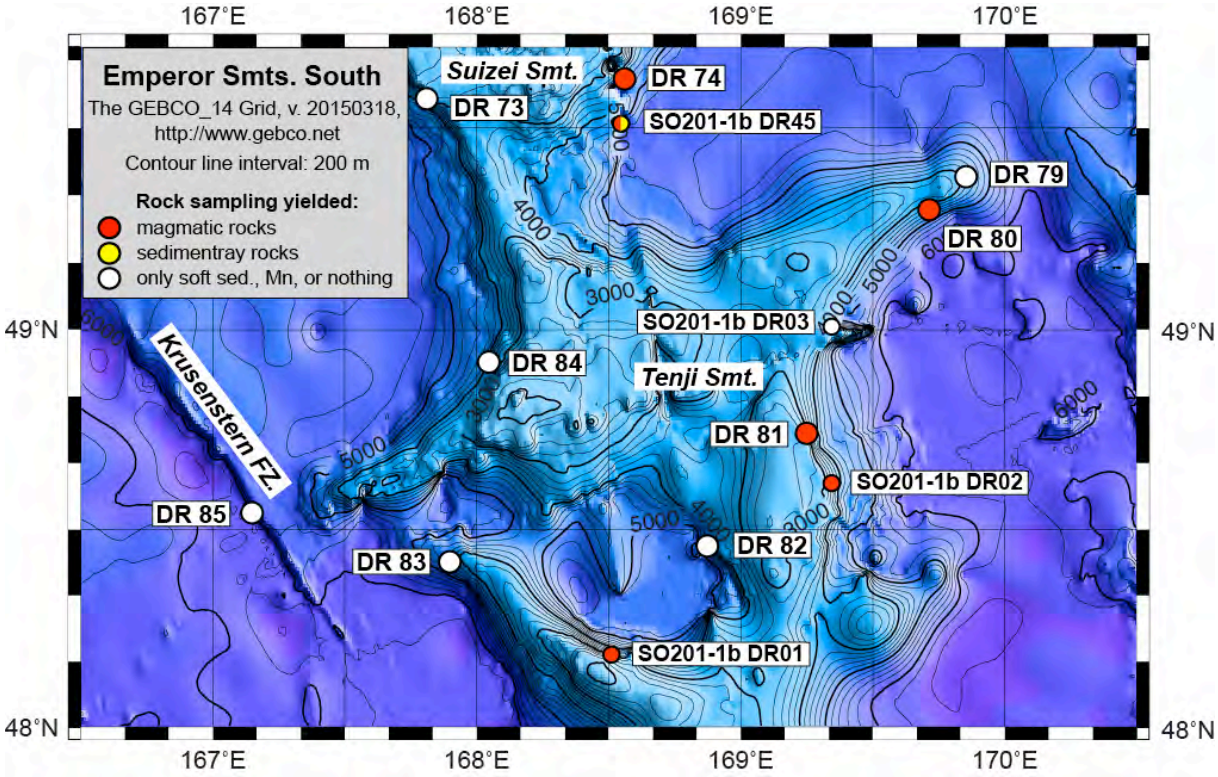


Fig. 7.35: Overview map of the southern SO-249 work area of the Emperor Seamounts along with stations of SO201-1b.

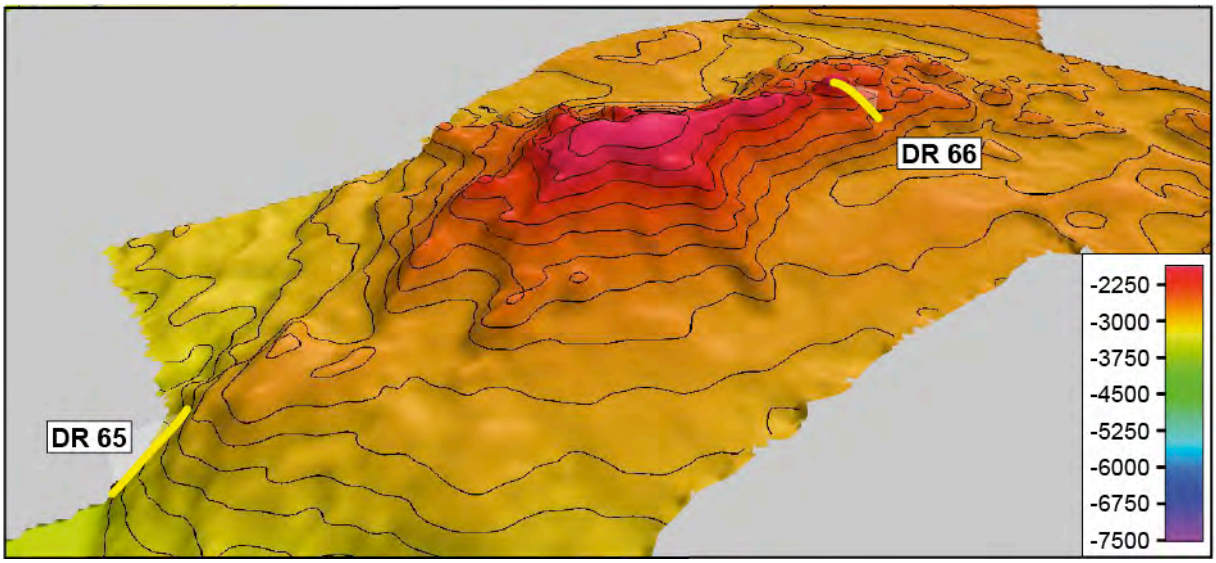


Fig. 7.36: Dredge sites DR65 and DR66 at the southern flank and in the top area, respectively, of Detroit Seamount (view from E to W). Stereo exaggeration, contours, and data sources as in figure 7.6.

Going from north to south the following observations and rocks were obtained:
Detroit: Out of three dredges only two returned rocks from the base and the top region of a

late stage volcanic edifice at the SW corner of Detroit (Figs 7.36 and 7.37). Due to the lack of an erosional plateau this feature must have built entirely submarine after submergence of the Detroit plateau. DR65 returned freshly broken Mn crust along with rounded igneous material of ice rafted origins and only a single angular clast of Px-Plg was assigned to be potentially *in-situ*. DR66 carried on the NW slope of a cone in the top region delivered a half full dredge of predominantly dropstones and only two but petrographically similar Ol phyric lavas may eventually be *in-situ*. Londsdale et al. (1993), however, describe recovery of *in-situ*, nephelinitic volcaniclastics along the SW slope of this cone making the dual occurrence of *in-situ* Ol-basalts less likely.

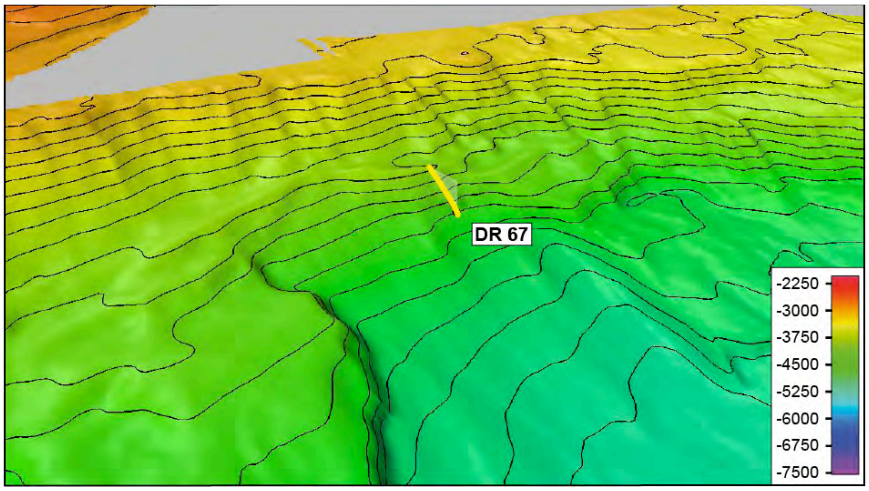


Fig. 7.37: Dredge site DR67 at the western Flank of Detroit Seamount (view from WNW to ESE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Hanzei: Sampling operations concentrated along the southwestern plateau edge (DR70) and a NE-SE striking ridge along the western margin (DR68 and 69) (Fig. 7.38). Here, small *in-situ* Ol bearing lava fragments and larger Plg-Px phyric lava clasts were found in volcaniclastic rocks of DR68. Variable dropstones and sediments were delivered by DR69 from the NW facing slope beneath the ridge crest and no *in situ* rocks could be assigned with confidence. A breccia with Cpx-Ol phyric lava fragments was obtained in DR70 along with fragments of similar petrography outside the breccia as well as fairly fresh, angular pieces of aphyric vesicular lava.

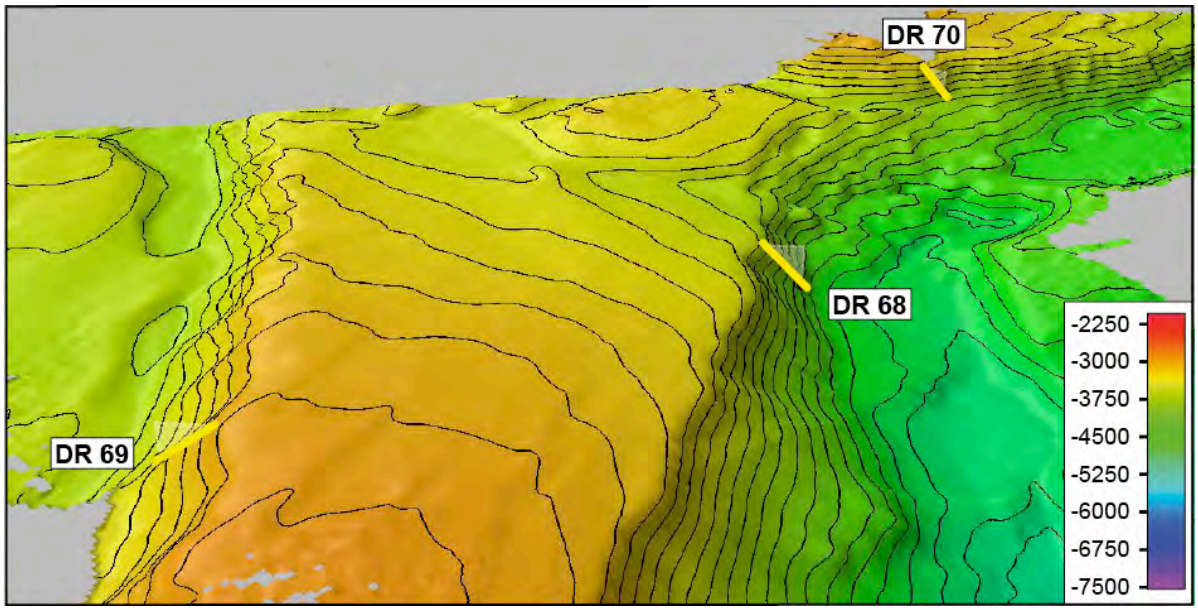


Fig. 7.38: Dredge sites DR68 - 70 at Hanzei Seamount (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Suizei: A total of five dredges were carried out and three of which contained possible *in-situ* igneous material (Figs. 7.39 and 7.40). DR72 on a post-erosional cone returned empty and

DR73 beneath the southwestern plateau edge delivered dropstones. Likely *in-situ* igneous rocks were a single large bloc of vesicular, Plg-Px-Ol phyric, reddish oxidized lava at DR71 indicating subaerial eruption / exposure consistent with the island stage of Suizei. Additional Plg-Px ±Ol basalts are fairly fresh to medium altered, lack alteration halos and thus are of questionable origin. DR74 and 75 were carried out beneath the eastern plateau edge of Suizei to complement earlier SO-201 station (Fig. 7.40). At DR74 a diabase clast with abundant Plg good for age dating was recovered from a breccia. A homogeneous dredge of Ol-Plg ± CPx lava fragments with fairly similar petrography in-between individual pieces was obtained at DR75 (Fig. 7.41). All have sub angular shapes and some appear to possess chilled margins indicating eruption in water. These rocks are definitely *in-situ* and may stem from the submarine shield phase of Suizei. This site confirms exposure of *in-situ* rocks in the NE corner of Suizei obtained nearby during SO-201-1b.

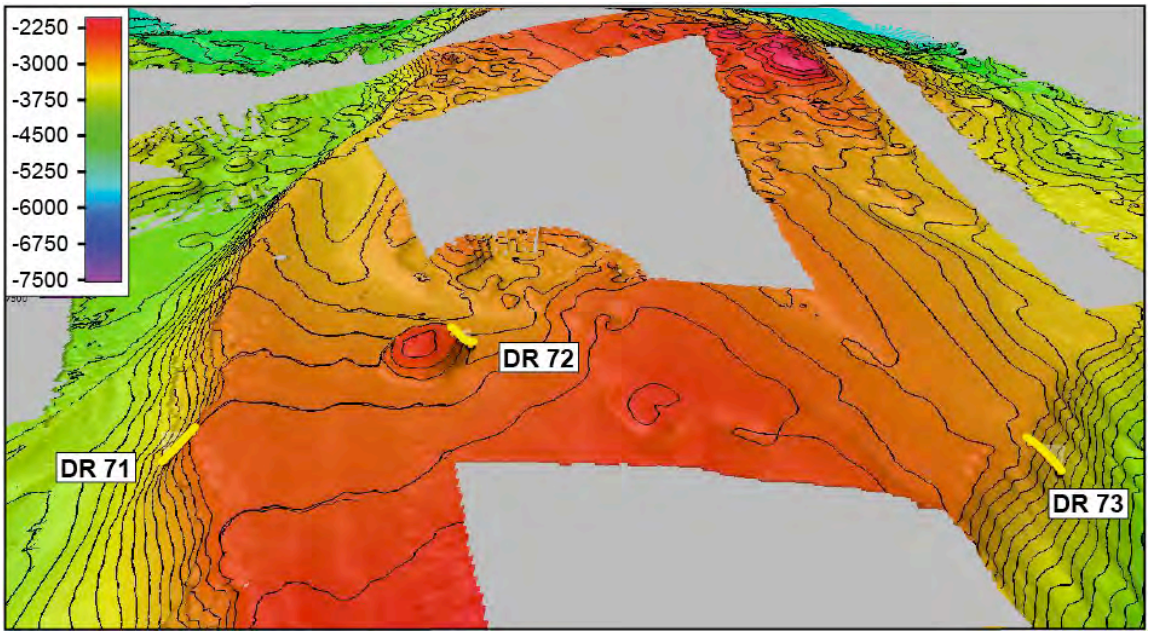


Fig. 7.39: Dredge sites DR71 - 73 in the western part of Suizei Seamount (view from W to E). Stereo exaggeration, contours, and data sources as in figure 7.6.

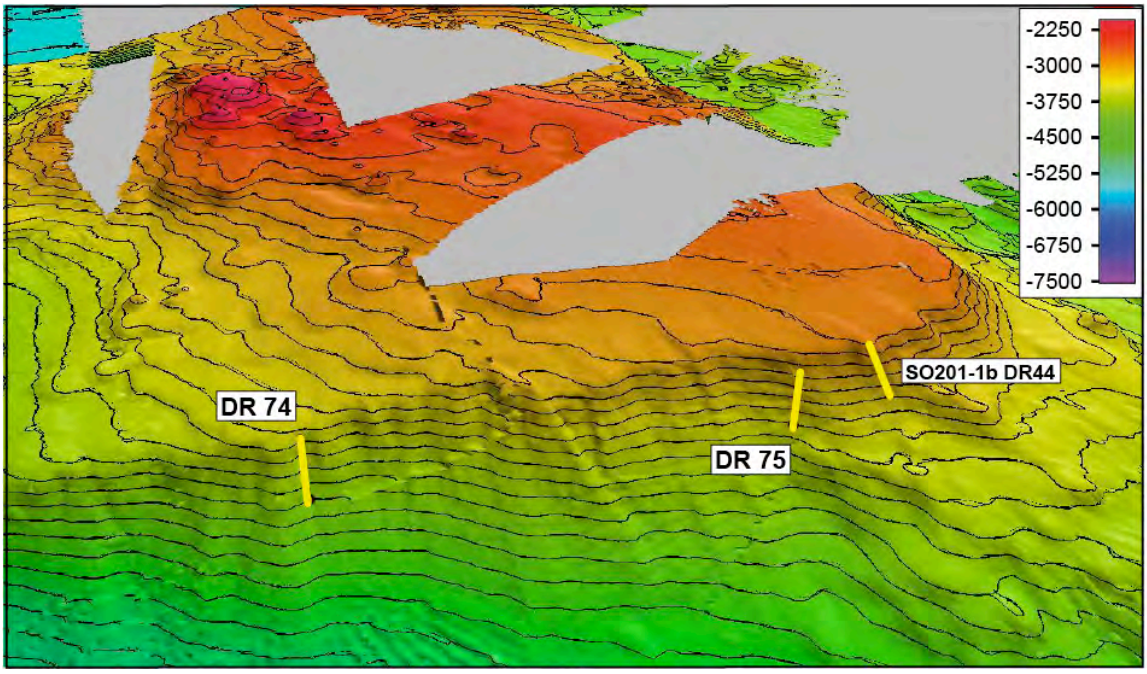


Fig. 7.40: Dredge sites DR74 and DR75 at the eastern flank Hanzei Seamount along with SO-201-1b station DR44 (view from E to W). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.41: Olivine – Plagioclase phyric pillow fragment from eastern slope of Suizei Seamount.

Fig. 7.42: Slightly Olvine phyric pillow lava fragment recovered as clast from Fe-Mn cemented breccia along northeastern ridge of Tenji Seamount.

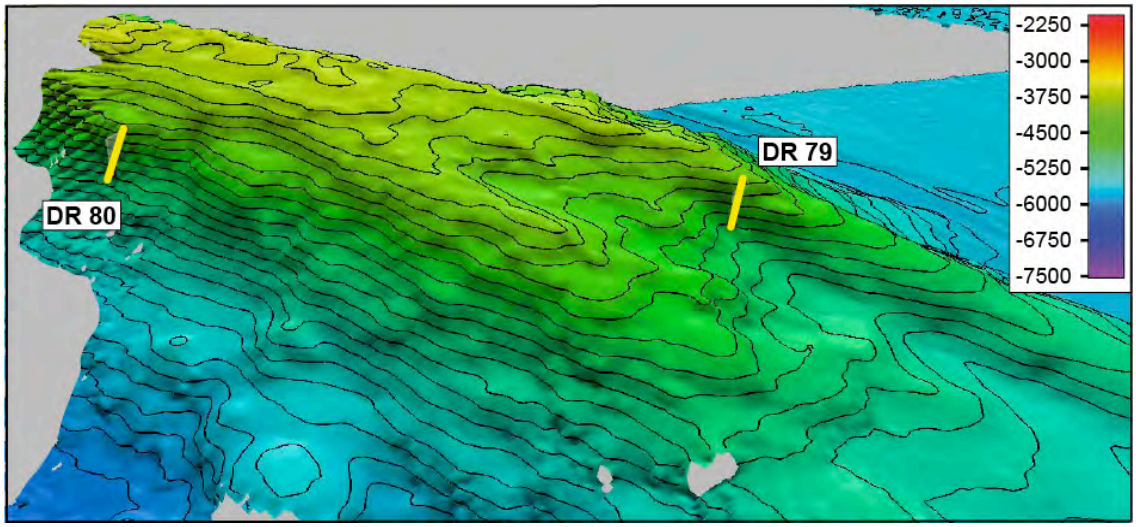


Fig. 7.43: Dredge sites DR79 and DR80 at a ridge-like feature emanating NE from Tenji Seamount (view from SE to NW). Stereo exaggeration, contours, and data sources as in figure 7.6.

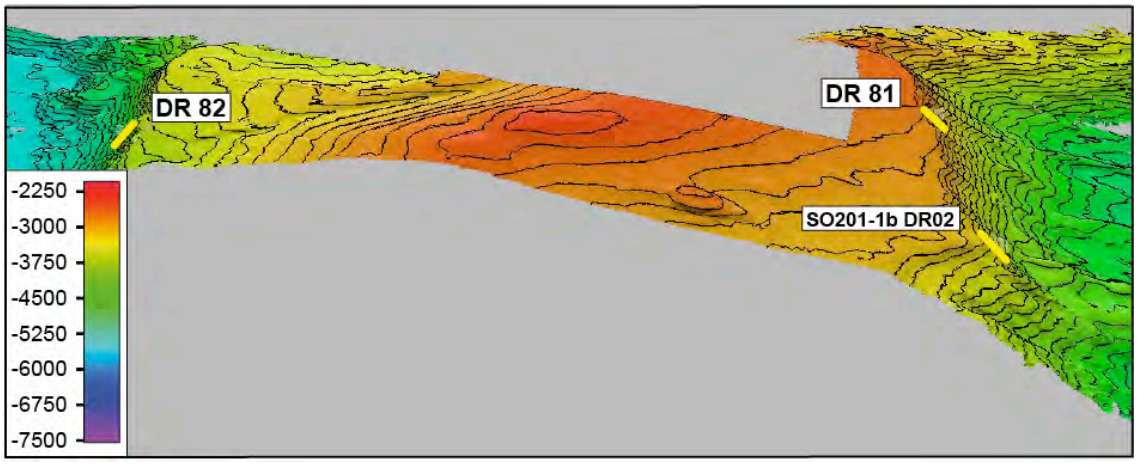


Fig. 7.44: Dredge sites DR81 and DR82 at the central part of Tenji Seamount along with SO-201-1b station DR02 (view from SE to NW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Tenji: Only two out of six dredge hauls delivered *in-situ* rocks while the majority returned empty, the others with dropstones (Figs. 7.42 - 7.45). *In-situ* rocks were Ol ±Plg basalt fragments recovered from a Mn encrusted breccia at DR80 on the SE facing slope of the northeastern Tenji ridge (Figs. 7.42 and 7.43). Similarly a highly altered lava fragment from a Mn crust is the only reliable *in-situ* rock of DR81. Other, much fresher Cpx ±Plg phyric lava fragments in DR81 are possibly dropstones and if analyzed must be evaluated with extreme caution.

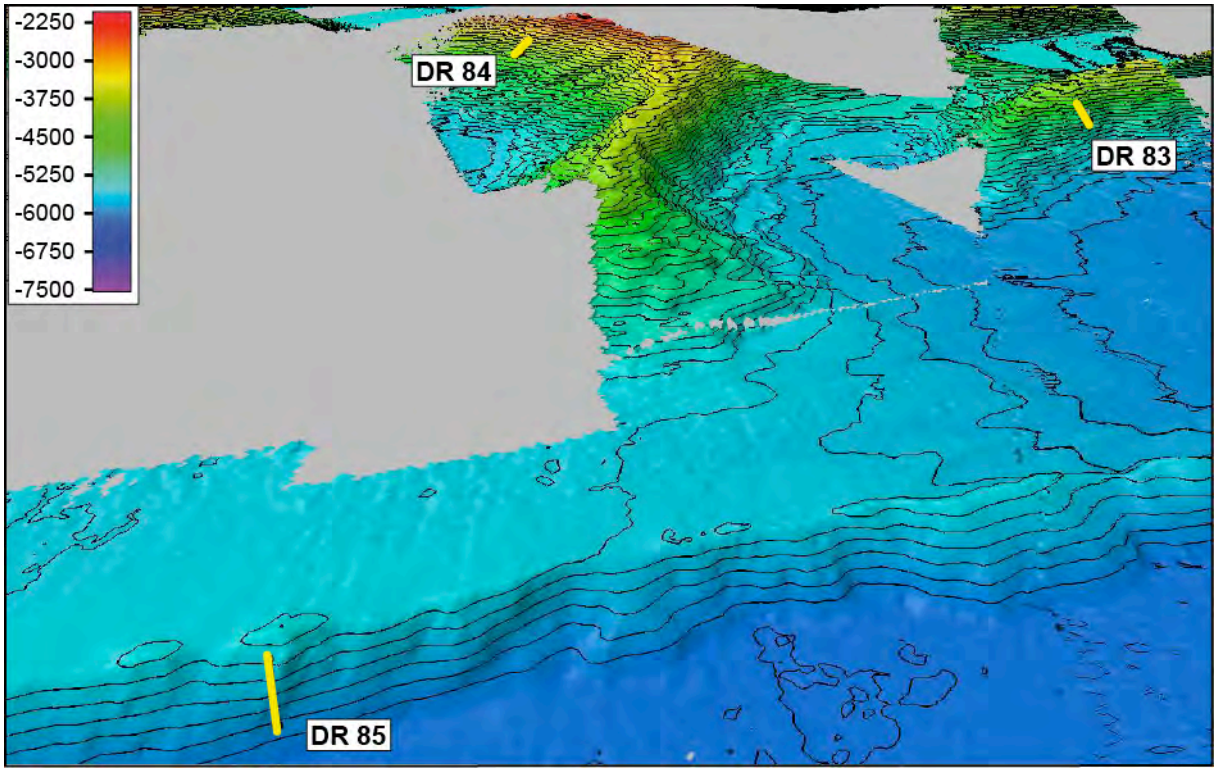


Fig. 7.45: Dredge sites DR84 and DR85 at the eastern section of Tenji Seamount (view from WSW to ESE). Dredge DR85 at the Krusenstern fracture zone is treated in the chapter "Krusenstern, N.N. Fracture Zone, and Basins in-between". Stereo exaggeration, contours, and data sources as in figure 7.6.

Other Intraplate Seamounts on the Pacific Plate (DR6, DR17–19, DR62–64, DR76–78, DR92-93)

Numerous intraplate volcanic structures show up on predicted bathymetric maps of the SO-249 working areas on the Pacific plate. They form singular, large volcanic edifices such as Adams Seamount (Fig. 7.5) or „Gummi Bear“ or comparatively small conical edifices on abyssal hills (Fig. 7.10) or large, randomly dispersed edifices such as the seamounts between Stalemate FZ and the Emperor Seamount Chain (Fig. 7.15). In any case their genesis appears unrelated to a stationary melting anomaly and more likely related to either off-axis volcanism or diffuse, temporal melting anomalies. Compositionally these structures have the potential to define geochemical end-members for the igneous input to the subduction factory as they likely represent low degree melts of geochemically enriched, more fusible portions of the Pacific mantle. Vice versa seamounts have been shown to be important sinks and release areas of fluids into and from the ocean crust long after extinction of volcanic activity (Fisher et al. 2003).

Adams Seamount located east of the Adak FZ is about entering the Aleutian trench which is also manifested by E-W trending bend faults dissecting the volcano. DR6 (Fig. 7.46) came back full with mostly pillow-lava fragments (some with fresh glassy margins), hyaloclastites with abundant large chunks of fresh glass (Fig. 7.47) and a minor group of subaerially erupted scoria (Fig. 7.48) and reddish oxidized lavas. Volcanologically DR6 covers the submarine stage with pillow lavas, the shallow water emergent stage by possibly the hyaloclastites and the subaerial / ocean island stage by the scoria and oxidized lavas.

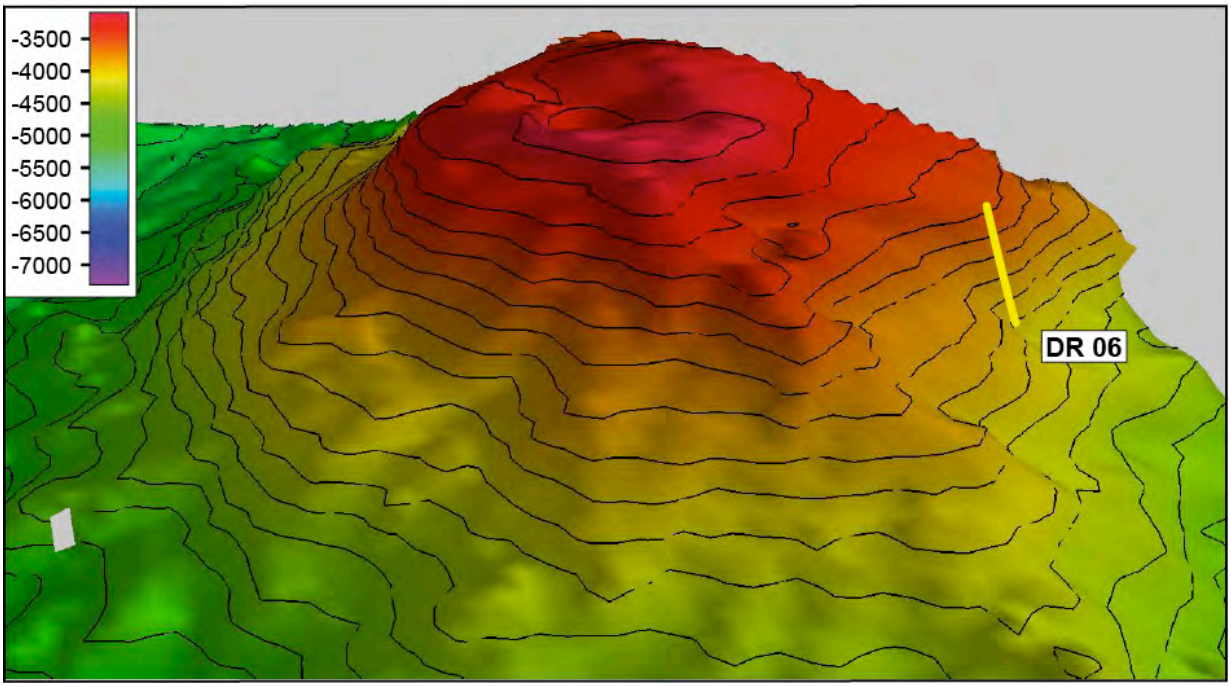


Fig. 7.46: Dredge site DR06 at Adams Seamount (view from NNE to SSW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.47: Largely palagonized hyaloclastite with abundant large chunks of fresh glass preserved (Adams Seamount).

Fig. 7.48: Volcanic breccia interpreted as flow top of an subaerial lava flow (Adams Seamount).

Smaller cones east of the Rat FZ were targeted on DR17 through DR19 (Figs. 7.10 and 7.49) but only DR18 delivered rocks, which were mostly dropstones and only a single breccia with aphyric, fairly fresh lava fragments.

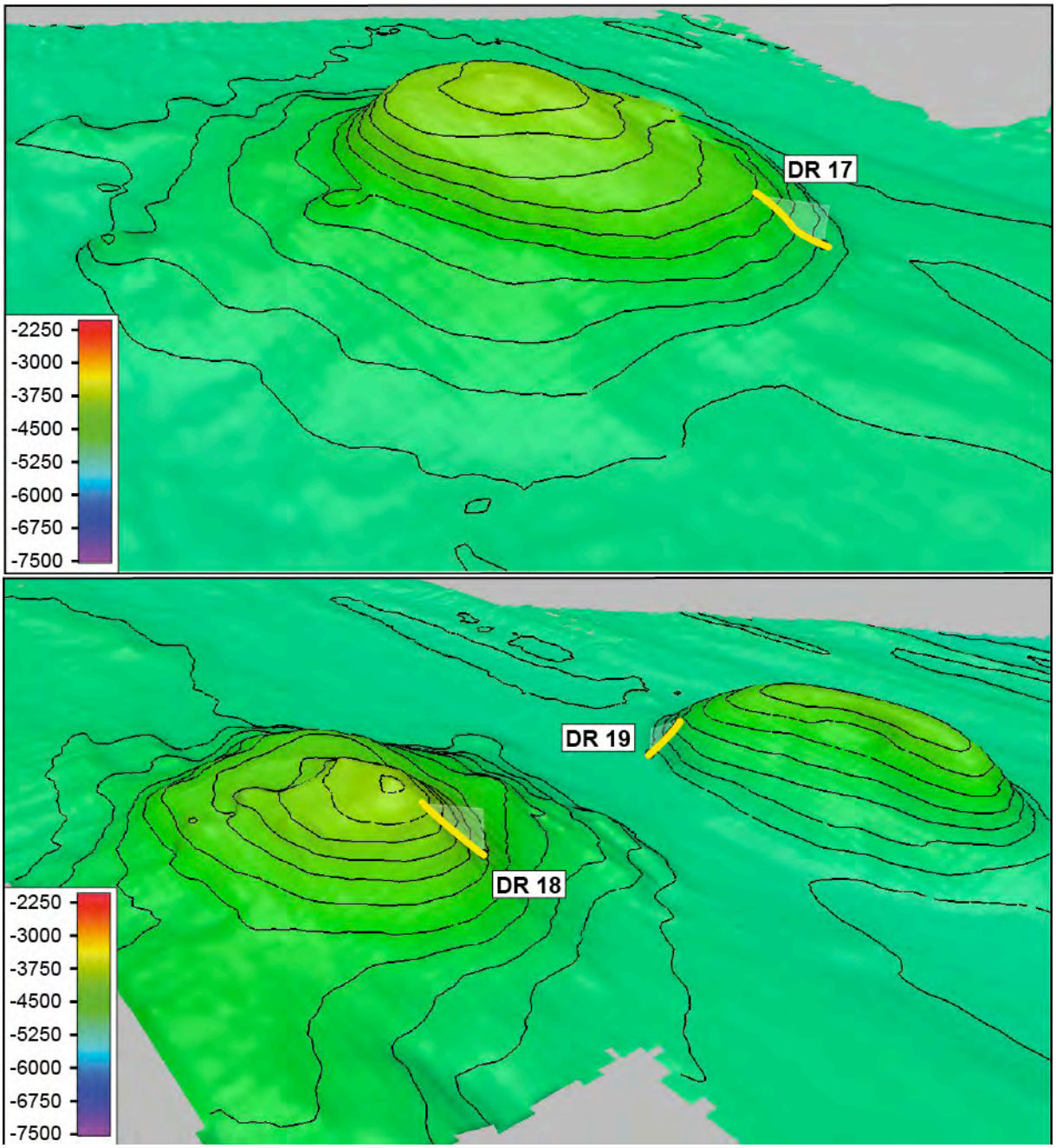


Fig. 7.49: Dredge sites DR17 through 19 at small cones located east of the Rat FZ (view from NW to SE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Seamounts on the ocean crust between the Emperor Seamounts and the Stalemate FZ are comparatively large with base diameters of several tenth of kilometers. They are irregularly distributed on the ocean floor (Figs. 7.15 and 7.34). Some possess guyot type morphologies while others are broad positive bathymetric anomalies without clearly expressed plateau margins indicating that they remained submarine throughout. DR62 carried out along the eastern flank of a ridge-like seamount (Fig. 7.50) west of Stalemate FZ gave abundant aphyric pillow lava and pillow fragments with fresh glass in places. A second group consists of porphyric lava fragments with variable amounts of altered Ol (±Px), some approaching several tenth percent of Ol giving them a picritic appearance. Finally a single Plg phyric lava may be used for age dating. Overall the quality of the whole rocks was found slightly to medium altered and suitable for geochemistry. DR63 aimed at the NE slope of a seamount (Fig. 7.50) and provided a suite of medium altered Px phyric lava, Ol basalt, aphyric lava and Ol ±Plg phyric lava fragments. Despite the petrographical heterogeneity they were all, preliminary, considered *in-situ* based on alteration, angularity and the co-occurrence of more obvious dropstones such as rounded pebbles and Amph-phyric andesites. Still the geochemistry of

samples DR63-1 through -4 needs to be treated with caution. DR64 aimed at a small cone on the northern slope of a seamount E of Detroit (Fig. 7.50). Lava fragments with variable phenocryst content including Ol-Px-, Plg- and Plg-Px phyric as well as aphyric varieties. Since such a variation is unexpected for a small (post erosional?) cone on the flanks of a guyot the cone is either a tectonic feature that collected debris or an ice rafted origin of some samples must be considered. Thus the geochemistry of these lavas must be carefully evaluated.

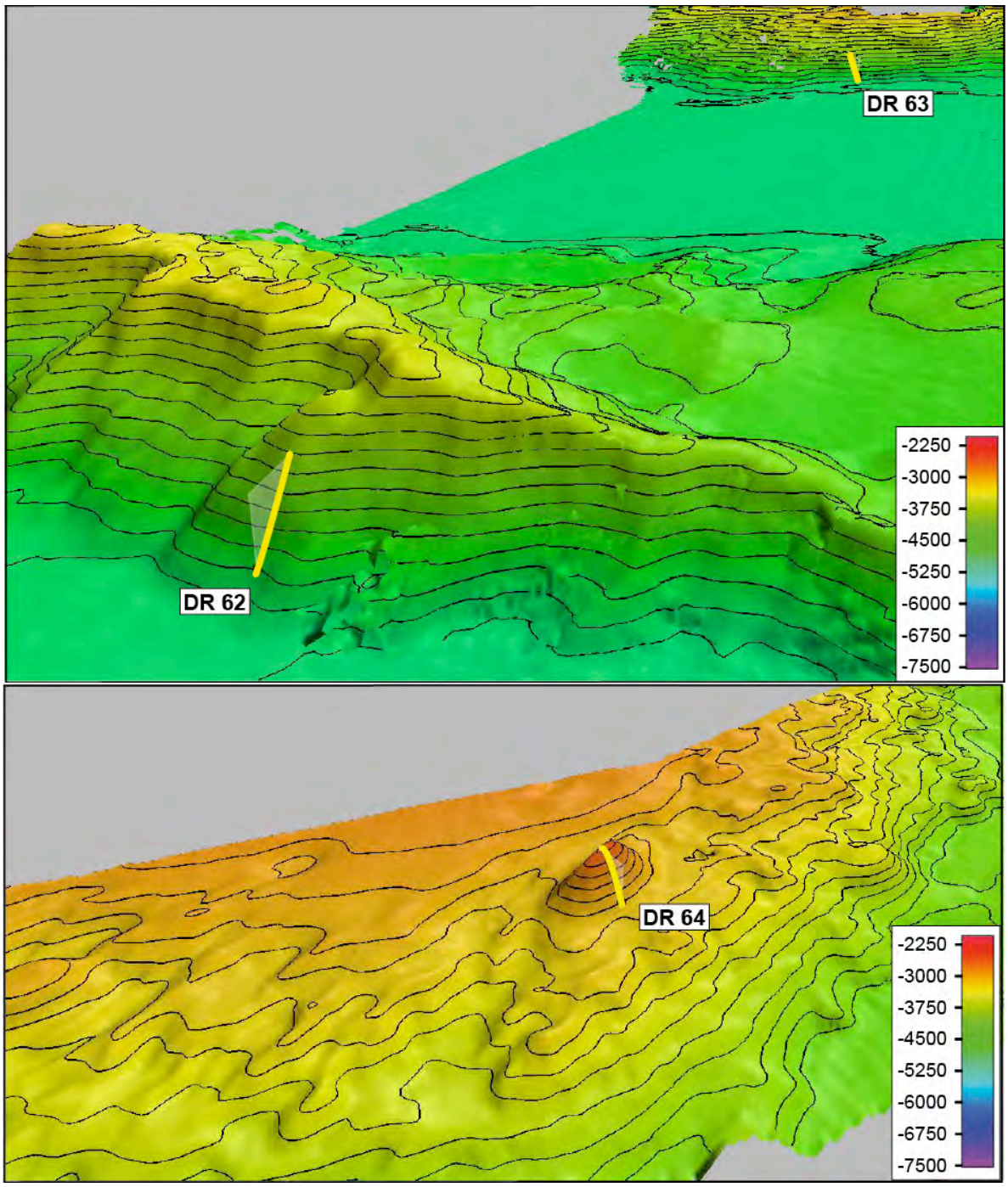


Fig. 7.50: Dredge sites DR62 through 64 at seamounts between the Stalemate FZ and the Emperor Chain (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

DR76 through DR78 were carried out at a prominent seamount 70 nm east of Hanzei (Figs. 7.34 and 7.51). In the top region DR76 delivered abundant, medium altered Ol-phyric pillow lava with sometimes well preserved glassy margins (Fig. 7.52). DR77 and DR78 along the southwestern flank provided only a few *in-situ* rocks. They include a single Plg-Px glomerocrystic lava at DR77 and very strongly altered Ol phyric pillow basalt fragments recovered from a large manganese crust at DR78.

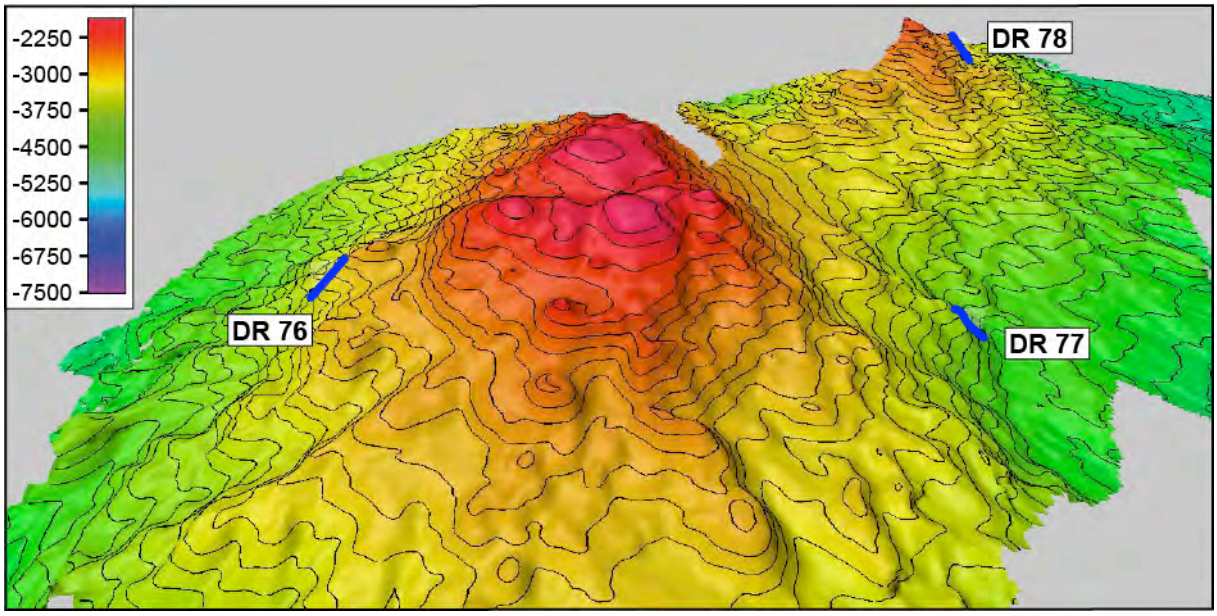


Fig. 7.51: Dredge sites DR76 through 78 at an unnamed seamount located c. 70 nm east of Hanzei (view from W to E). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.52: Olivine phyric pillow lava with chilled margin and abundant fresh glass preserved. Unnamed Seamount on ocean crust between Stalemate FZ and Emperor Seamounts.

Fig. 7.53: Fairly fresh, aphyric pillow lava from "Gummi Bear" Seamount in-between N.N. and Krusenstern FZ's.

On the Pacific plate west of the Krusenstern FZ, only a single intraplate volcano was sampled and given the working name „Gummi Bear" according to its bathymetric appearance (Figs. 7.26 and 7.54). The NE and E slopes were sampled at DR92 and DR93, respectively. Besides few dropstones, moderately altered, aphyric pillow lava fragments (Fig. 7.53), altered hyaloclastites and minor lava with large Plg phenocrysts was delivered by DR92. Fresh glass was observed in the chilled margin of DR92-10. Fairly altered pillow lava and fragments thereof characterize DR93. Fresher varieties were more coarse grained and may represent the core of pillows. Yellowish green, coarse grained and unsorted hyaloclastite is totally altered. The largest hyaloclastite bloc contained an angular, strongly altered Plg phyric basalt fragment (-8). Overall no fresh glass observed on abundant chilled margins in DR93.

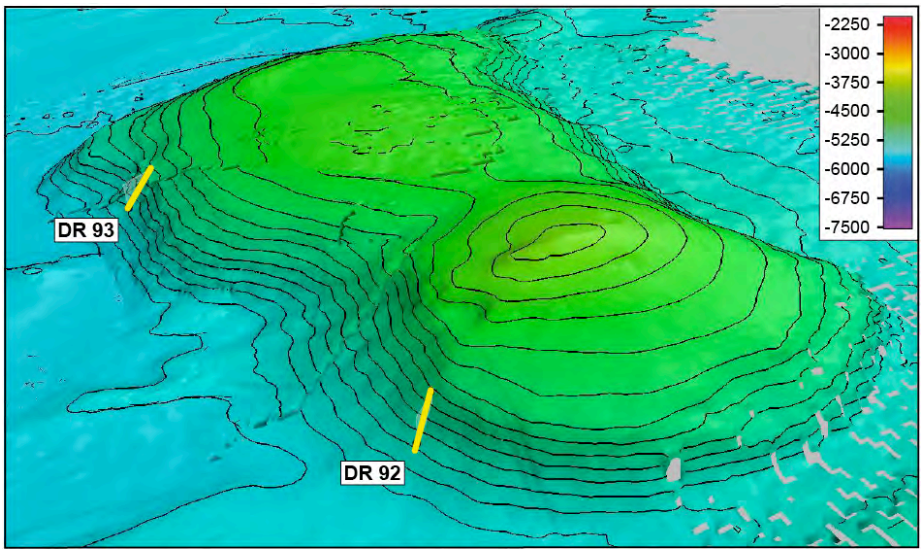


Fig. 7.54: Dredge sites DR92 and DR93 at a seamount between Krusenstern and N.N. FZ which has been named „Gummi Bear“ Seamount by the cruise participants according to its bathymetric appearance (view from ESE to WSW). Stereo exaggeration, contours, and data sources as in figure 7.6.

7.2.2 Inception and Evolution of the Aleutian Arc

G. Yogodzinski, R. Werner

Dredges summarized here targeted volcanic and plutonic rocks from the early magmatic history of the Aleutian Arc, including the Komandorsky Islands area. These dredges were located on basement rock exposures of all types, including submarine canyons, basement ridges and lower forearc outcrops.

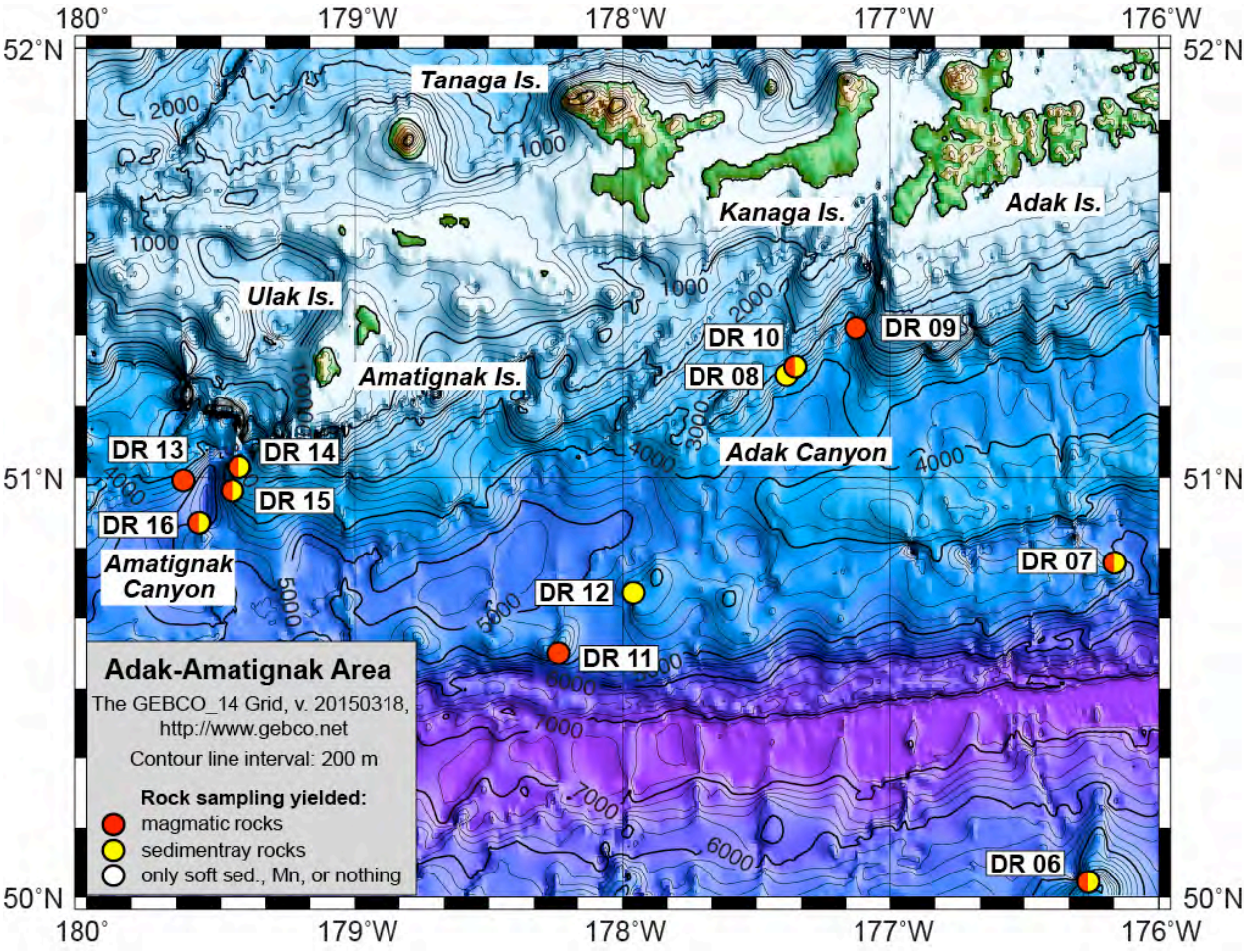


Fig. 7.55: Overview map of Adak and Amatignak Canyon.

Adak Canyon (DR8–10)

The head of the Adak Canyon is at 51°39.4'N and 177°2.1'W, within 2 km of the southwestern shoreline of Adak Island. The foot of the canyon lies at 51°15.6'N and 177°15.4'W at a depth of approximately 4,000 m (Fig. 7.55).

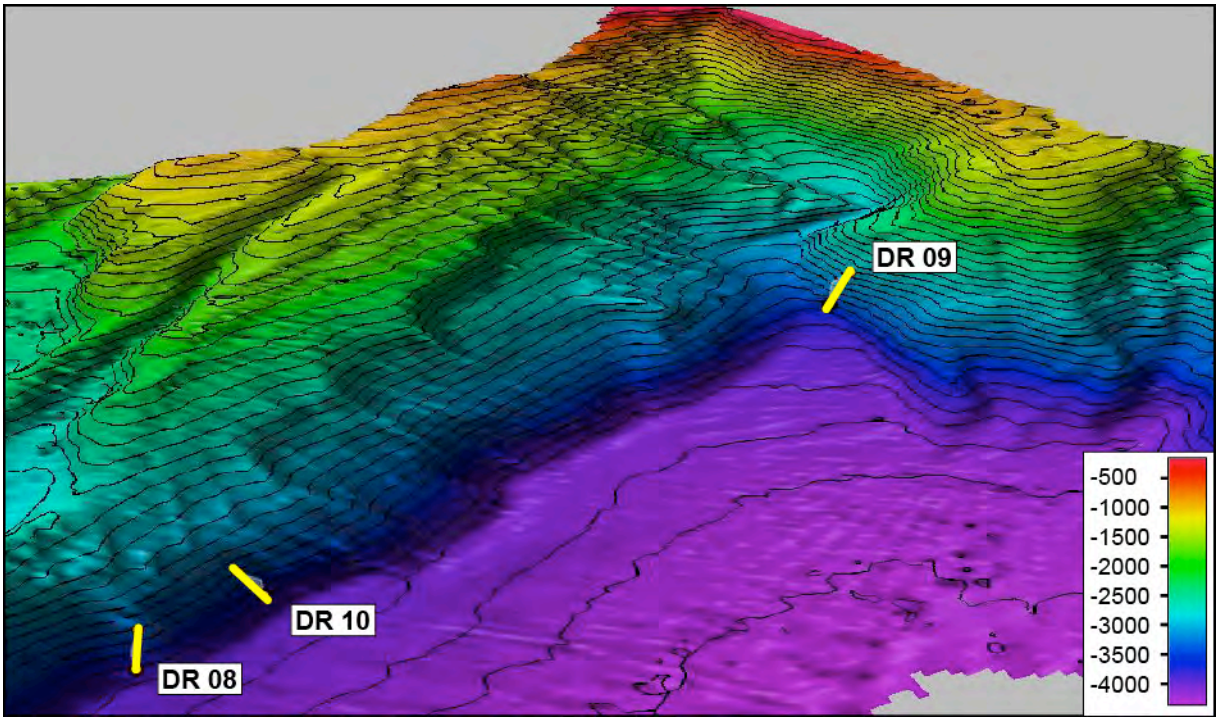


Fig. 7.56: Dredge sites DR8 - 10 at the walls of Adak Canyon (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

The steepest slopes, which are on the west-facing wall of the canyon, were sampled by DR9 in the depth interval of 3,500 - 2,900 m (Fig. 7.56). This dredge was nearly full and contained primarily subangular and subrounded volcanic rocks. Most samples are vesicular with sparse-to-abundant phenocrysts of plagioclase ± amphibole and other mafic minerals (Fig. 7.57). Significant weathering is present in most samples but many are appropriate for geochemistry and petrographic analysis. Steep, SE-facing slopes at the base of Adak Canyon were sampled in DR8 in the depth interval 3,720 - 3,403 m, and in DR10 in the depth interval 3,700 – 3,400 m. DR8 produced one small stone of uncertain sedimentary or metasedimentary origin. DR10 was approximately 25% full and produced a variety of subrounded and subangular volcanic and sedimentary rocks. Volcanic rocks are mostly vesiculated and partially weathered with variable mineralogy and including several that are appropriate for geochemistry and petrographic analysis.

Fig. 7.57: Relatively fresh Amphibole-Plagioclase phyric lava from Adak Canyon.

Amatignak Canyon (DR13-16)

The head of the Amatignak Canyon is at 51°18.4'N and 179°18.1'W, immediately off the western shoreline of northern Amatignak Island. The base of the canyon lies in a broad, gently sloping area around 50°54.3'N and 179°40.4'W, at depths of greater than 5,000 m on the surface of the forearc terrace (Fig. 7.55).

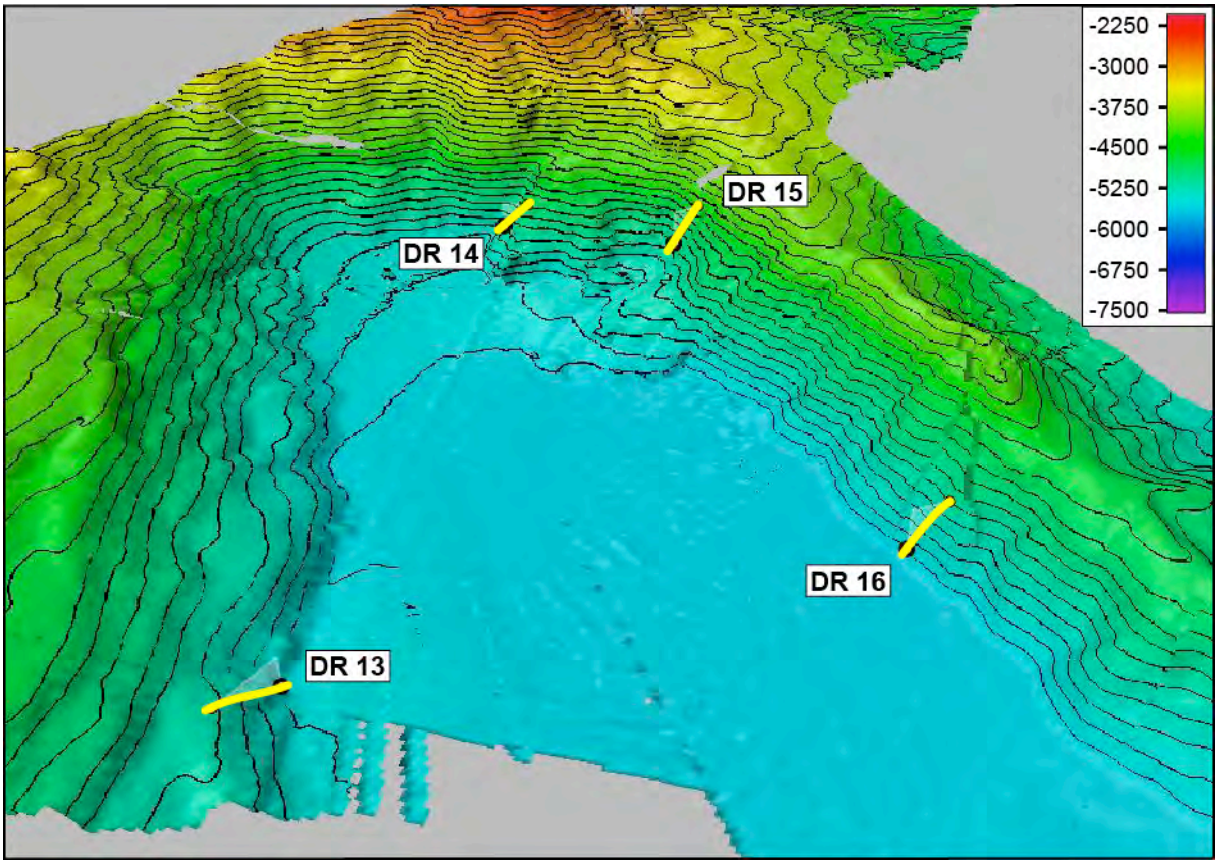


Fig. 7.58: Dredge sites DR13 - 16 at the walls of Amatignak Canyon (view from WSW to ENE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.59: Plagioclase-Hornblende phyric Andesite from lower part of Amatignak Canyon.

DR13 sampled the SE-facing wall of the canyon in the depth interval of 5,426 – 5,050 m, immediately above the canyon floor (Fig. 7.58). This dredge contained few rocks but included one volcanic or fine-grained intrusive / diabasic rock with phenocrysts of plagioclase and dark-colored minerals. DR14 sampled the north-facing slope of a spur of the canyon's SE margin, in the depth range of 5,130 to 4,619 m. This dredge contained few rocks, which were mostly sedimentary but also included two breccias containing dominantly volcanic clasts. DR15 and

16 sampled the steep, NW-facing wall of the canyon at two offset locations that covered a depth interval of 5,523 to 4,188 m. DR15 was approximately 25% full and contained a mixture of volcanic and sedimentary rocks, including four subrounded-subangular volcanic samples containing phenocrysts of plagioclase and mafic minerals. DR16 was also approximately 25% full and contained variety of rock types including several lava fragments with phenocrysts of plagioclase and mafic minerals (Fig. 7.59). DR16 also includes three samples described as volcaniclastic tuffs and one possible plutonic rock. Several samples in Dredges 15 and 16 appear relatively fresh and are appropriate for geochemical and petrographic analysis.

Murray Canyon (DR25-32)

DR25, 28, 29 and 30 constitute a group of closely spaced dredges on the steep, NW-facing wall of Murray Canyon, approximately 40 km SW of the southernmost tip of Kiska Island (Figs 7.60 and 7.61). These dredges are offset to sample this slope in the depth interval 3,430 – 2,978 m from the base of DR25 to the top of DR30.

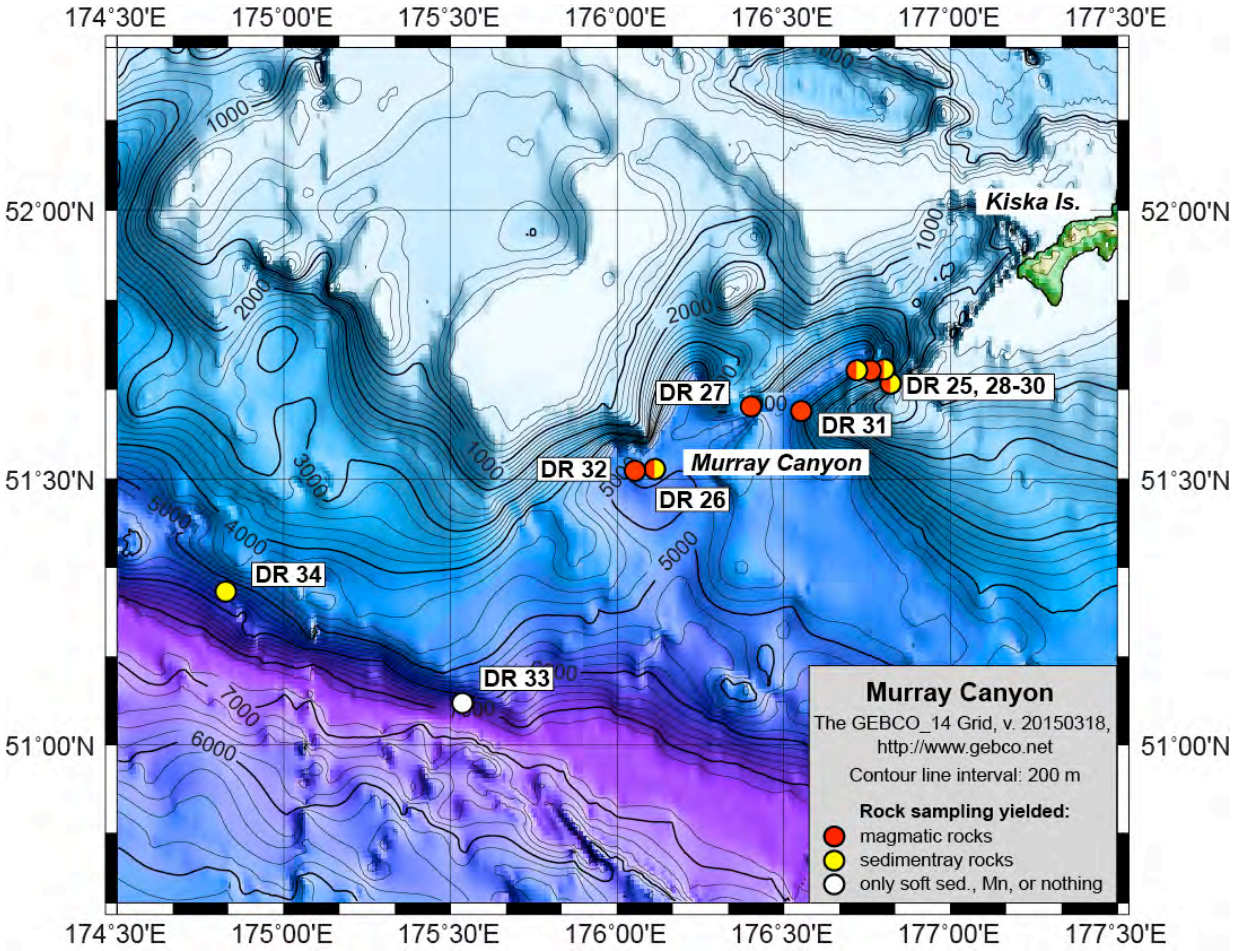


Fig. 7.60: Overview map of Murray Canyon and adjacent areas.

DR25 was 25% full, with a mixture of igneous and sedimentary rocks. Most igneous rocks are vesicular lava fragments with phenocrysts of plagioclase, pyroxene ± amphibole. Many are described as fresh. Some diabase or microgabbro is also present. DR28 contained few rocks, but most are lava fragments, showing variable amounts of alteration. Several are aphyric and lack vesicles. Some contain phenocrysts of plagioclase, pyroxene and altered olivine. DR29 was full and includes a wide variety of igneous rock types, including both mafic volcanic rocks and grabbroic intrusives with transitional types such as diabase / microgabbro (Fig. 7.62). Many samples appear relatively fresh. Sample 29-7 is described as an olivine-phlogopite-plagioclase basalt. DR30 was 25% full, with a mixture of igneous and sedimentary rocks. Igneous rocks are a mixture of volcanic and plutonic lithologies including angular and rounded shapes, variable degrees of alteration, and some described as fresh. Many samples in the dredge sequence are appropriate for geochemistry and petrographic analysis.

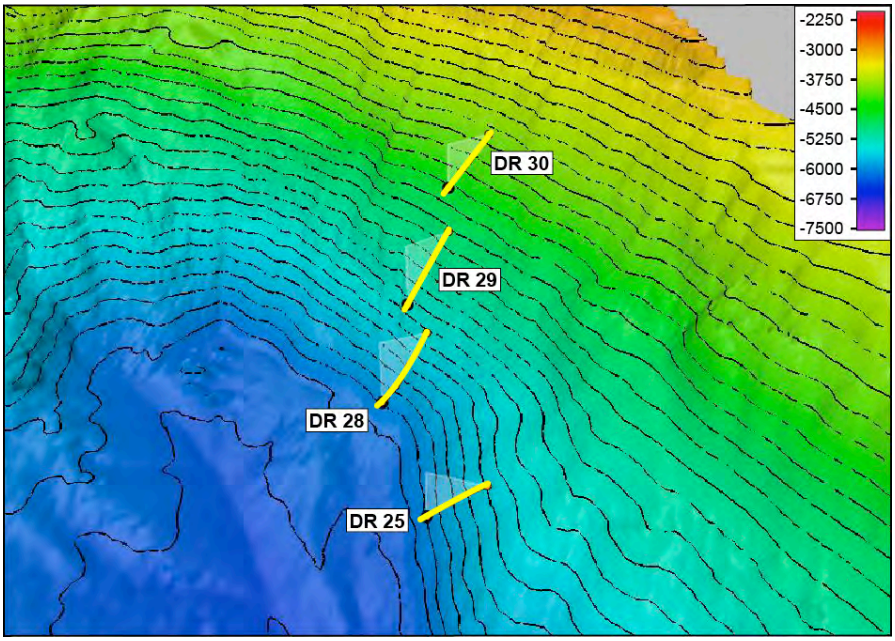


Fig. 7.61: Dredge sites DR25 and 28 - 30 at the at the eastern wall of Murray Canyon (view from W to E). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.62: Fresh Plagioclase-Clinopyroxene ± Hornbelnde gabbro from eastern wall of Murray Canyon.

Moving down the canyon to the SW, DR 27 and 31 sampled opposite sides of Murray canyon separated by a distance of approximately 10 km (Fig. 7.63). DR31 sampled the base of the east spur at the opening of the canyon in the depth interval 4,280 to 3,863 m. This dredge contained few rocks, which were mostly sedimentary but included one slightly altered, subangular volcanic sample containing phenocrysts of plagioclase and mafic minerals. DR27 sampled the opposite, SE-facing wall of the canyon in the depth interval 4,089 to 3,683 m. This dredge also returned few rocks. All samples are angular to subrounded lava fragments with phenocrysts of plagioclase and mafic minerals (Fig. 7.64).

Further again to the SW, DR26 and 32 sampled deep slopes on the SE-facing wall of Murray Canyon (Fig. 7.63), immediately above the forearc terrace. DR26 sampled the depth interval 4,445 to 4,067 m. This dredge was 25% full and returned a mixture of variably solidified, deep-water sediments, but also included a single sample of subangular, plagioclase-phyric basalt, appropriate for geochemistry and petrographic analysis. DR32 sampled the depth interval 4,197 to 3,816 m. This dredge was approximately 15% full, and contained abundant consolidated sediment samples and several lava fragments, including angular to

rounded mafic lithologies containing phenocrysts of plagioclase and mafic minerals. Several samples from this dredge are appropriate for geochemical and petrographic analysis.

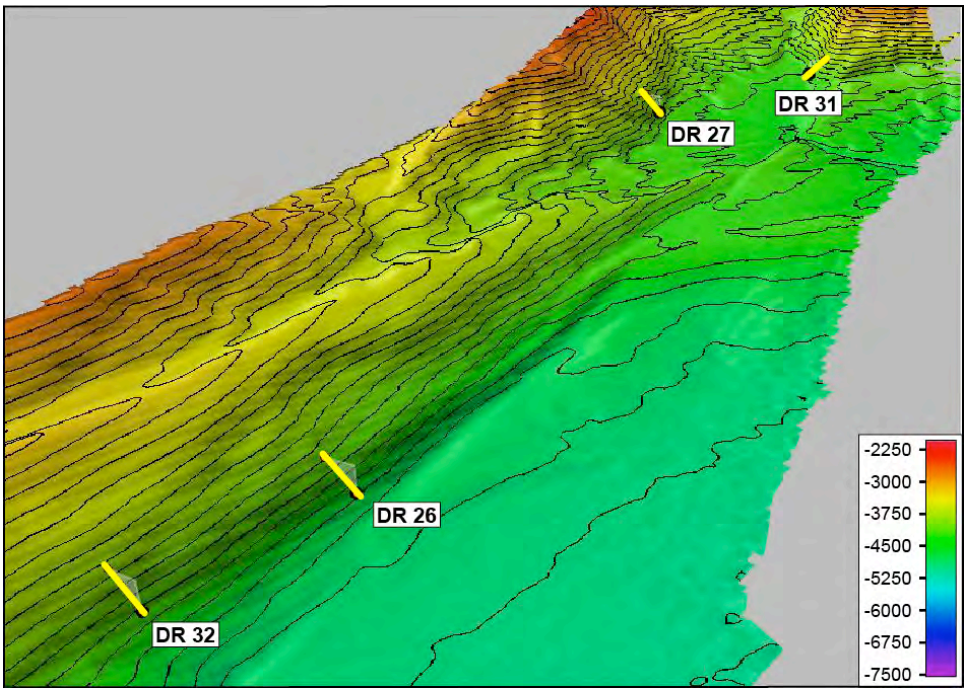


Fig. 7.63: Dredge sites DR26, 27, 31, and 32 at Murray Canyon (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.64: Plagioclase-Clinopyroxene-Olivine phyric lava from western wall of Murray Canyon.

Canyons South of Attu (DR48-51)

DR48 to 51 sampled basement exposures south and west of Attu Island (Figs. 7.65 and 7.66). DR48 was located approximately 80 km WSW of the western tip of Attu Island. This dredge sampled the south-facing slope of a SW-striking ridge in the depth interval between 3,815 and 3,493 m. The dredge returned 25% full and contained a mixture of semi-consolidated mud with few rocks. The rocks were also a mixture of sedimentary and volcanic lithologies including two volcanic samples that might be appropriate for geochemistry and thin section analysis.

Dredges DR49 and 50 were located on the SW-facing wall of Agattu Canyon (Fig 7.66). They sampled the depth interval from approximately 3,700 to 3,300 m. DR49 returned mostly mud with rounded fragments of semi-consolidated sediment and three subangular to subrounded fragments of porphyritic volcanic rock that appear appropriate for geochemical and petrographic analysis. DR50 returned primarily semi-consolidated mudstones and sandstones. No volcanic or other igneous rocks were present in this dredge.

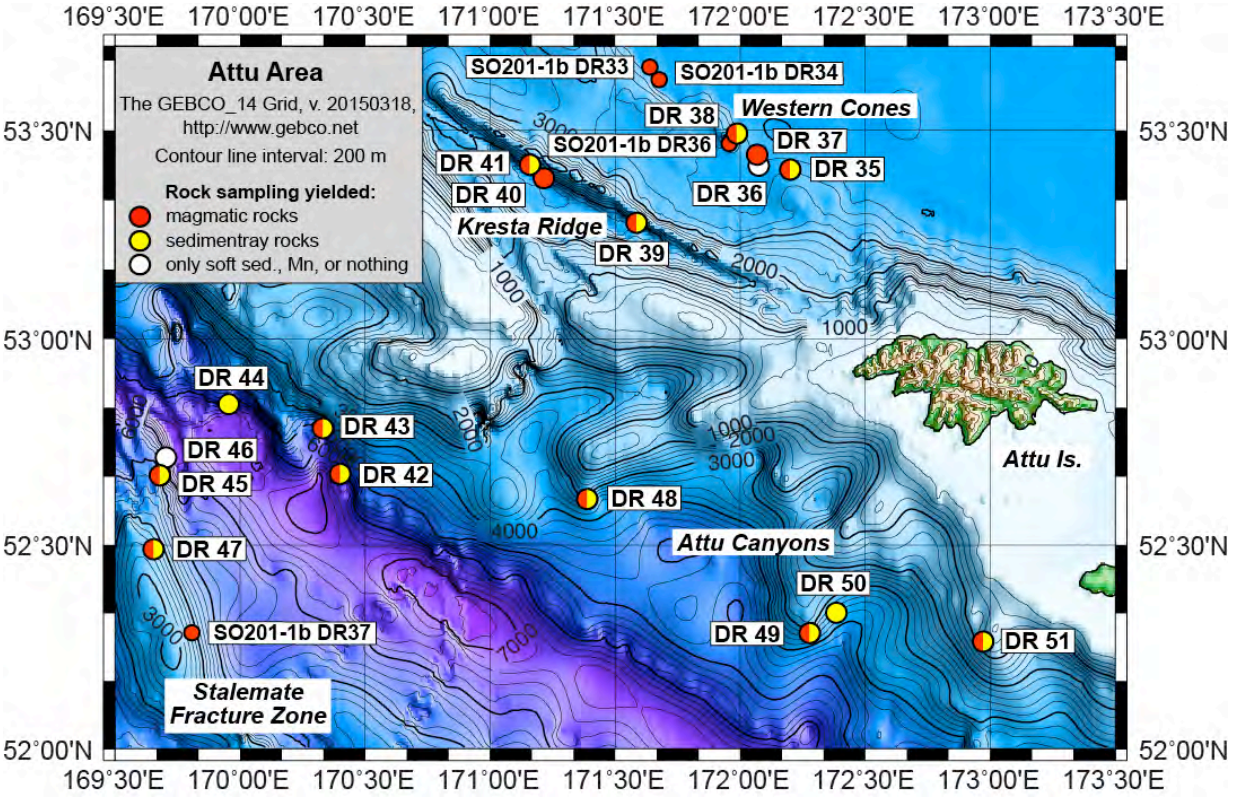


Fig. 7.65: Overview map of Attu Area including Attu Canyons, Western Cones and Kresta Ridge.

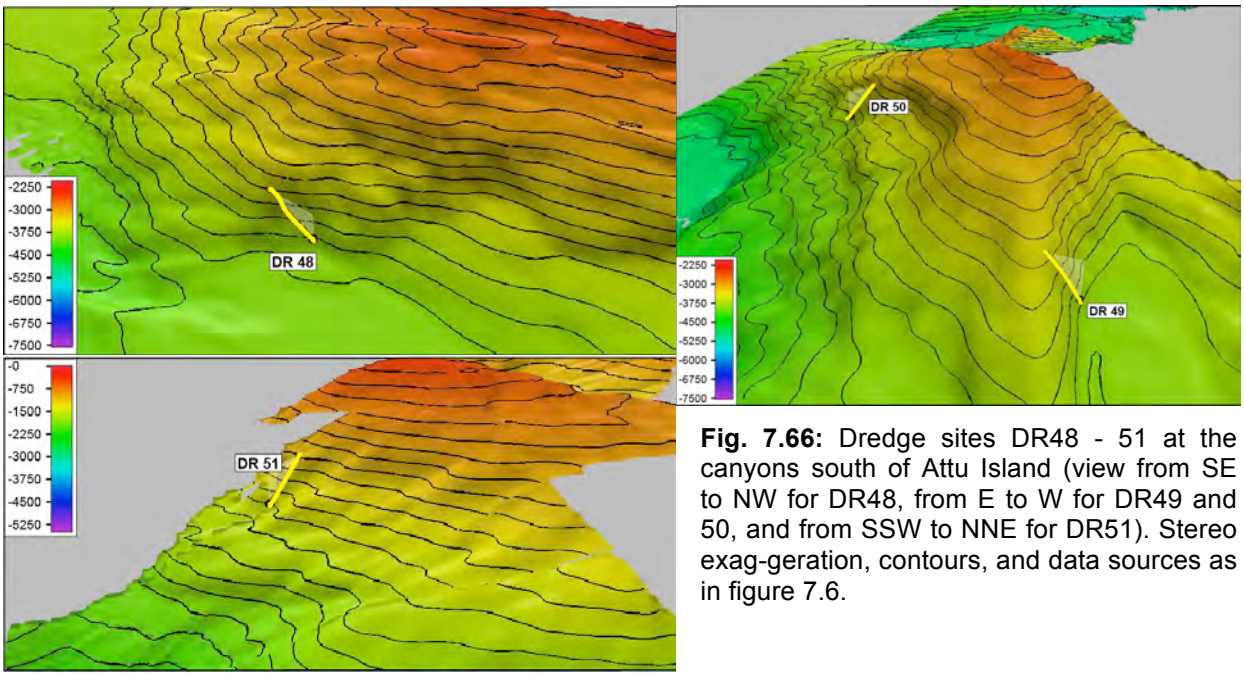


Fig. 7.66: Dredge sites DR48 - 51 at the canyons south of Attu Island (view from SE to NW for DR48, from E to W for DR49 and 50, and from SSW to NNE for DR51). Stereo exag-geration, contours, and data sources as in figure 7.6.

DR51 was located approximately 31 km SW of the western tip of Agattu Island (Figs. 7.65 and 7.66). This dredge, which sampled a relatively shallow depth interval of 1,512 to 1,100 m, returned 25% full and contained a variety of subrounded to angular fragments of volcanic rock. Many samples are aphyric but some contain phenocrysts of plagioclase and pyroxene or amphibole (Fig. 7.67). Some diabase is also present. Several samples are appropriate for geochemical and petrographic analysis.

Fig. 7.67: Fairly fresh, slightly brecciated, aphyric lava from the uppermost slope of Attu Island.

Kresta Ridge (DR39-41)

Kresta Ridge is a NW-striking ridge of uplifted seafloor located NW of Attu Island (Fig. 7.65). The ridge is an expression of right-lateral strike-slip faults that bound the northern margin of the Aleutian arc and accommodate arc-parallel transport of crustal blocks underlying Aleutian islands west of Buldir, which are not sites of active volcanism.

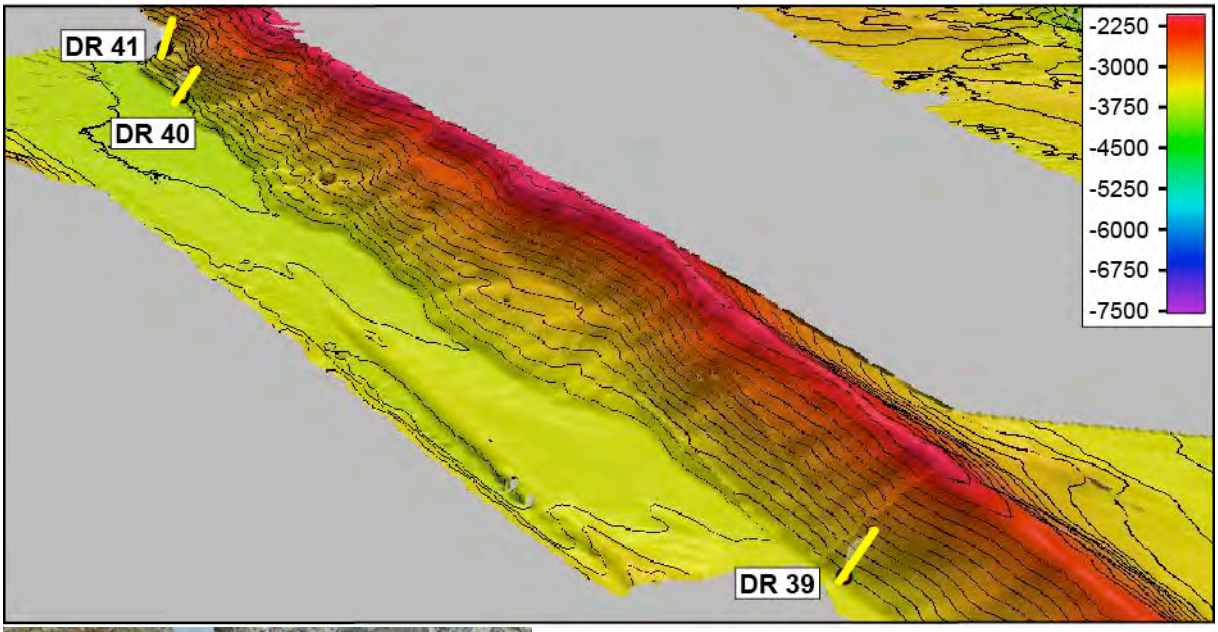


Fig. 7.68 (above)**:** Dredge sites DR 39 - 41 at the southern flank of Kresta Ridge (view from SE to NW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.69 (left)**:** Hornblende bearing granodiorite from Kresta Ridge.

Dredges DR39 - 41 (Fig. 7.68) sampled similar depth intervals between 3,570 and 2,903 m. All dredges were 25-50% full and all recovered a mixture of lithologies including volcanic and sedimentary breccias, which appear to be cataclastites / tectonites. Many show clear signs of brittle deformation and including glassy material interpreted to be pseudotachylite. DR40 included a notable mixture of freshly broken plutonic rocks, with pieces of hornblende granodiorite throughout the dredge, some cut by veins of epidote (Fig. 7.89). Some volcanic rocks appropriate for geochemical and petrographic analysis are also present in these dredges.

Lower Forearc / Inner Trench Wall (DR7, DR11-12, DR33-34, DR42-44)

Dredges described here were taken at levels below the forearc crustal blocks that underlie the islands, which were sampled heavily by the canyon dredges summarized above. These generally deeper dredges were taken from the edge of the forearc terrace and from deeper outcrops in the lower forearc, which is essentially the inner trench wall (Figs 7.55, 7.60, and 7.65). Most of these dredges returned a mixture of rock types but also included a quantity of semi consolidated muddy sediment, which is interpreted to be the dominant matrix material accreted by subduction to the lower forearc.

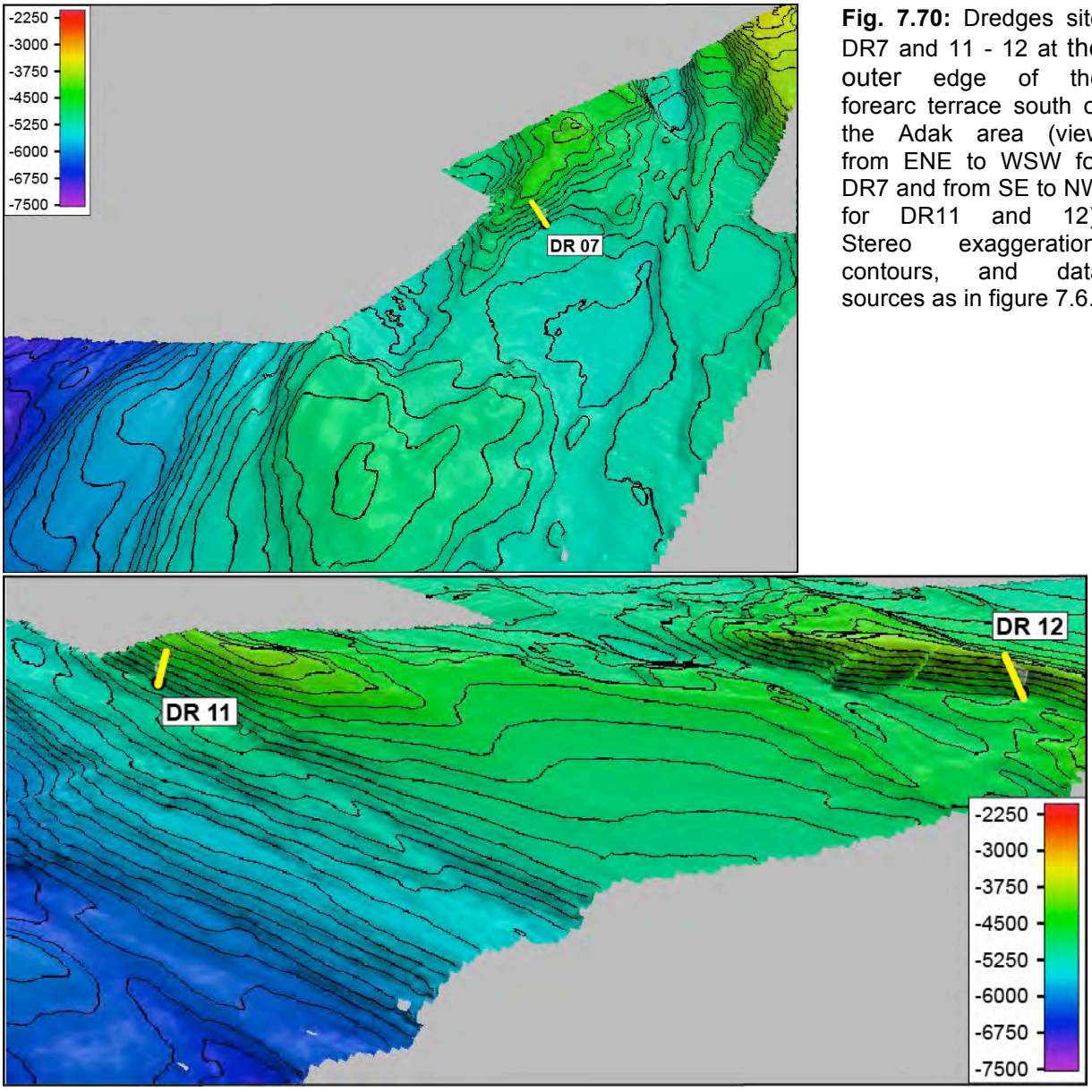


Fig. 7.70: Dredges site DR7 and 11 - 12 at the outer edge of the forearc terrace south of the Adak area (view from ENE to WSW for DR7 and from SE to NW for DR11 and 12). Stereo exaggeration, contours, and data sources as in figure 7.6.

Dredges 7, 11 and 12 were collected from the outer edge of the forearc terrace south of the Adak area in the depth interval of 4,560 to 3,917 (Fig. 7.70). DR7 was 50% full and contained

a variety of lithologies, including volcanic-plutonic rocks, schists and semi-consolidated sediment. The variety and number of rocks in this dredge is judged to be a reflection of the north-facing slope upon-which the dredge was collected, which appears to have acted as a barrier preventing transport of material to greater depths. Several volcanic samples in DR7 are appropriate for geochemical and petrographic analysis Fig. 7.71). DR11 contained only a single rock, which was a rounded and relatively fresh olivine basalt, judged appropriate for geochemical and petrographic analysis. DR12 was 50% full but was found to be a mixture of semi-consolidated mud combined with a mixture of sedimentary rocks showing different degrees of metamorphism. No volcanic or plutonic rocks were present in this dredge.

Fig. 7.71: Fresh, plagioclase phyric lava fragment from lower forearc of the Adak area.

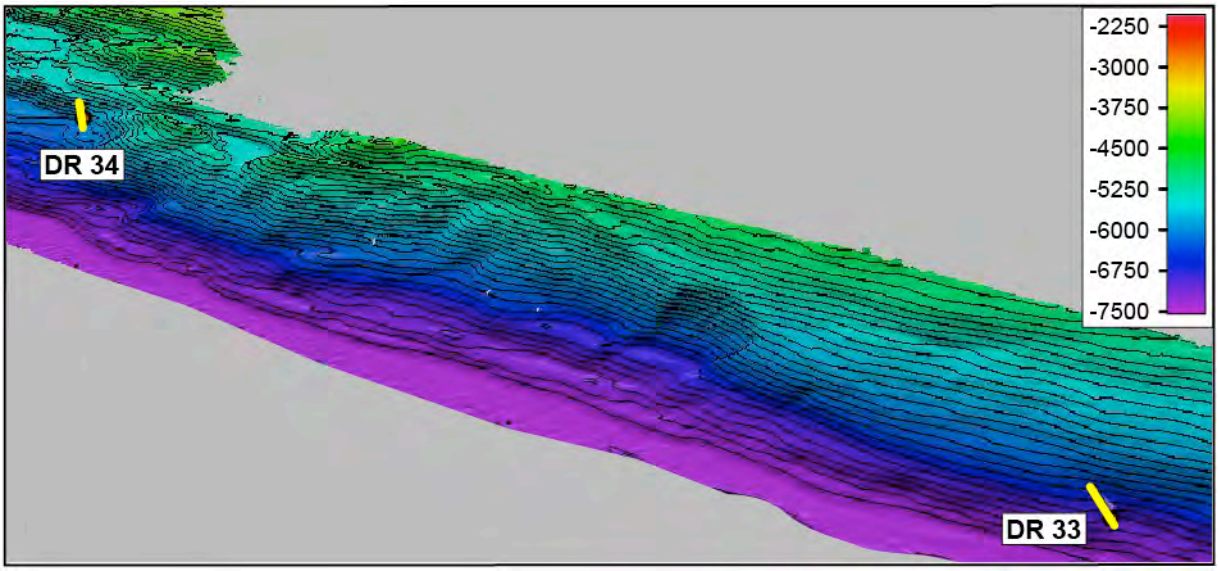


Fig. 7.72: Dredge sites DR33 and 34 at the lower forearc south of Murray Canyon (view from SE to NW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Dredges DR33 and 34 were taken southwest of Murray Canyon from the lower forearc / inner trench wall in the depth interval 6,790 to 5,703 m (Fig. 7.72). DR33 was 25% full but contained only semi-consolidated mud. DR34 was also 25% full and contained a mixture of different muddy sediment types in different states of consolidation. No volcanic or plutonic rocks were present in these dredges.

Dredges DR42-44 were taken west of Attu Island from the lower forearc / inner trench wall in the depth interval 6,670 to 5,377 m (Fig.7.73). DR42 was 67% full and contained primarily a mixture of sedimentary and volcaniclastic rocks, many exhibiting high levels of alteration. One meta-gabbro sample was also collected. These are judged to be *in-situ* rocks exposed by recent faulting at the plate boundary. Some samples judged appropriate for geochemical and petrographic analysis. DR43 was 15% full and contained primarily, semi-consolidated mud. A

single, subrounded volcanic rock containing phenocrysts of hornblende was also present. DR44 was 20% full and contained a mixture of semi-consolidated mud and mixture of sedimentary rock types. No igneous rocks present in DR44.

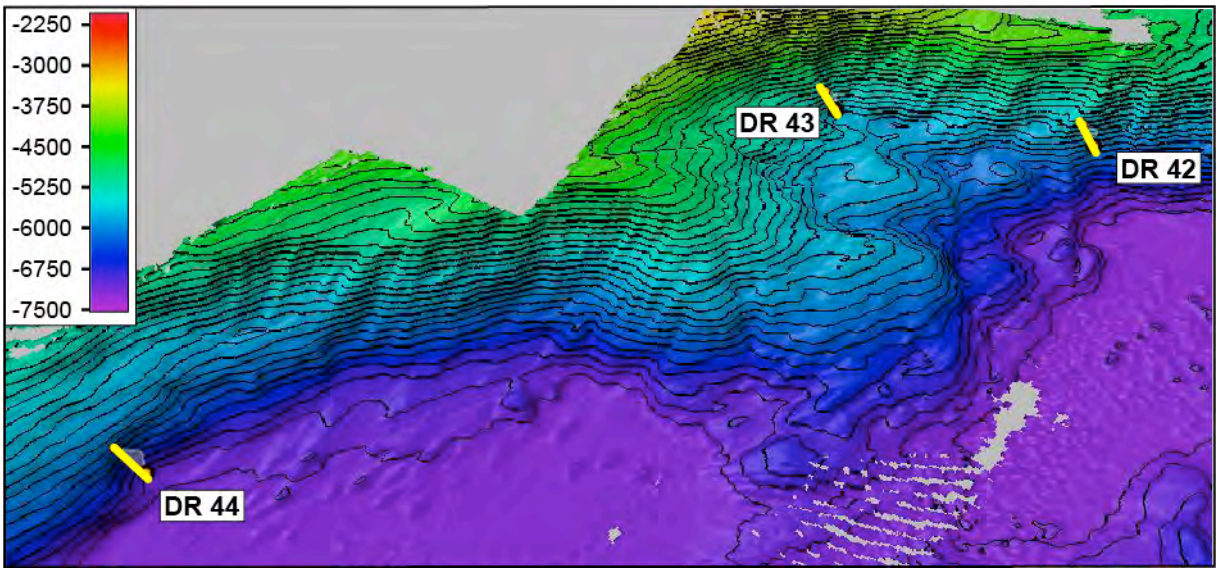


Fig. 7.73: Dredge sites DR42 through 44 at the lower forearc / inner trench west of Attu Island (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.74: Meta-Gabbro from lower forearc WSW of Attu Island.

Komandorsky Block (DR103-104, DR134-139, DR147-148, DR149-156)

Dredges DR103-104 were taken on a bathymetric spur in the forearc south of Bering Island (Figs. 7.75 and 7.76). Steep slopes on this feature were dredged in the depth interval of 5,383 to 4,704. DR103 was approximately 15% full and DR104 contained only a few rocks. Both dredges returned sedimentary rock only, dominantly sandstones but including mudstones and claystones. These results are similar to dredging done in 2009 during SO201-2 in nearby locations in the forearc, and with the geology of central and southern Bering Island, which is underlain entirely and steeply tilted sedimentary rocks.

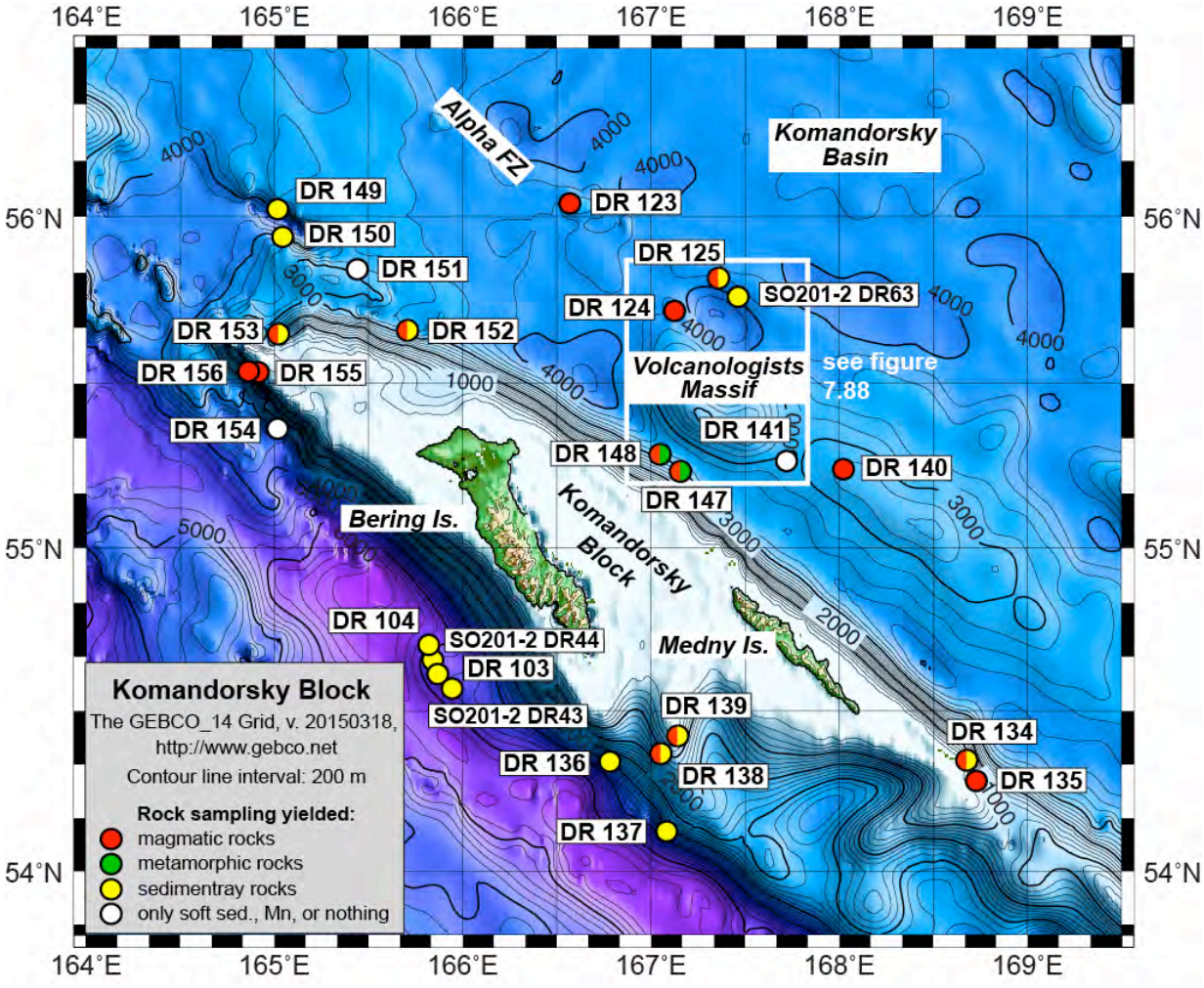


Fig. 7.75: Overview map of the Komandorsky Block including Bering and Medny Island. The Volcanologist Massif NE of the Komandorsky Block houses Piip volcano the westernmost expression of active volcanism in the Aleutians.

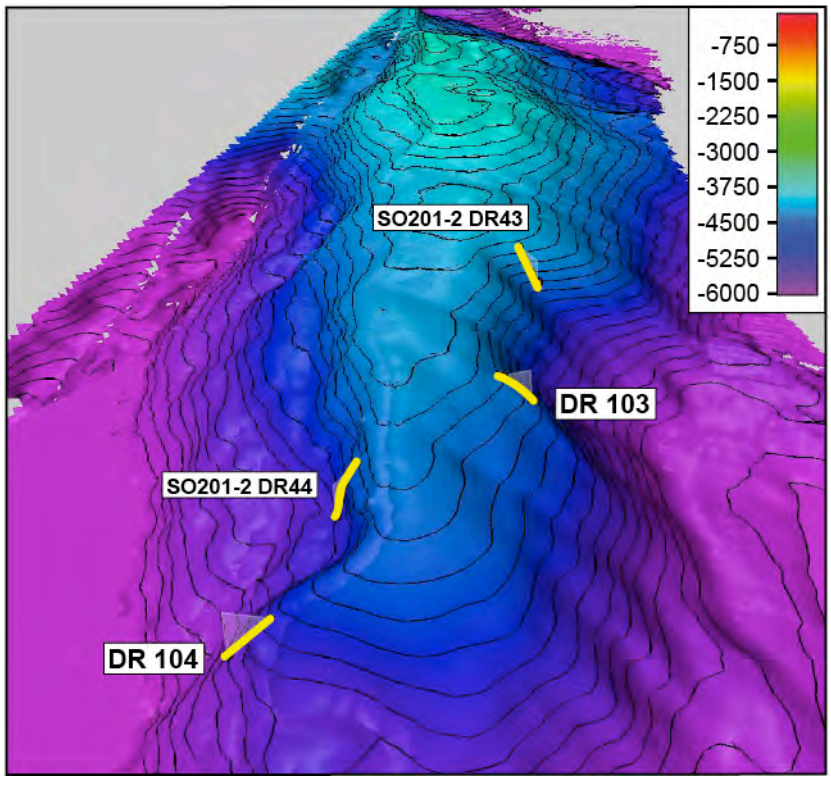


Fig. 7.76: Dredge sites DR103 and 104 along with SO-201-2 sampling sites a bathymetric spur in the forearc south of Bering Island (view from NW to SE). Stereo exaggeration, contours, and data sources as in figure 7.6.

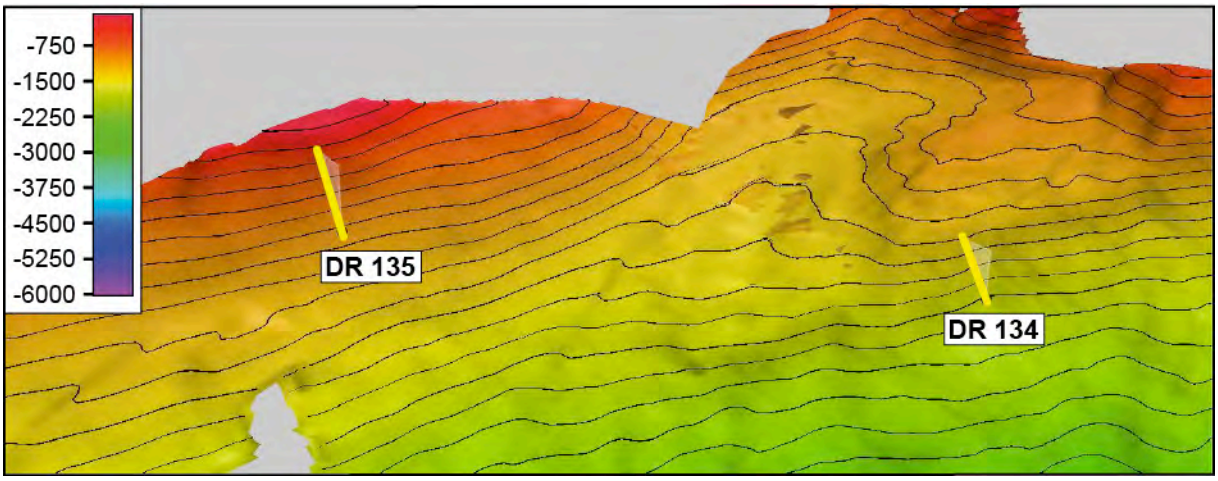


Fig. 7.77: Dredge sites DR134 ad 135 at the at the crest of a ridge on the eastern section of the Komandorsky Block (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Dredges 134-139 were taken on the eastern Komandorsky Block, in locations east and southeast of Bering Island. Dredges 134 and 135 were taken near the crest of a flat-topped ridge, approximately 45 km southeast of the southeastern tip of Medny Island, in the depth interval 1,645 to 344 meters (Fig. 7.77). DR134 was 50% full and DR135 was full. Twenty-six samples were taken from these dredges (13 each). Rocks types represented among the samples from these dredges are volcanic and volcaniclastic only. Textures are variable from aphyric to coarsely porphyritic with phenocrysts of plagioclase and amphibole (Fig. 7.78). All samples show some effects of alteration, but nearly all are considered appropriate for geochemical and petrographic analysis.

Fig. 7.78: Amphibole-Clinopyroxene ± Plagioclase phyric andesite from guyot at the SE tip of the Komandorsky Block.

Dredges DR136 – 139 were taken on forearc slopes southeast of the southernmost tip of Bering Island (Fig. 7.79). Dredges DR136 and 137 were collected in the depth interval 3,998 to 3,350 meters. DR136 was 25% full and DR137 contained few rocks. Rock types present in these dredges were sedimentary only. Dredges 138 and 139 were collected in the depth interval 1,390 to 424 meters, on canyon slopes above the previous two dredges. DR138 was 33% full. DR139 was full. DR138 returned a mixture of sedimentary, volcanic/intrusive and volcaniclastic rock types. Igneous samples identified in DR138 are an aphyric volcanic rock, an olivine-pyroxene basalt, a hornblende-plagioclase andesite and a hornblende diorite. These

samples are considered appropriate for geochemical and petrographic analysis. Rocks recovered in DR139 were dominantly sedimentary. Only two igneous samples were collected from DR139 (pyroxene andesite and micro-dolerite), despite the fact that the dredge was full.

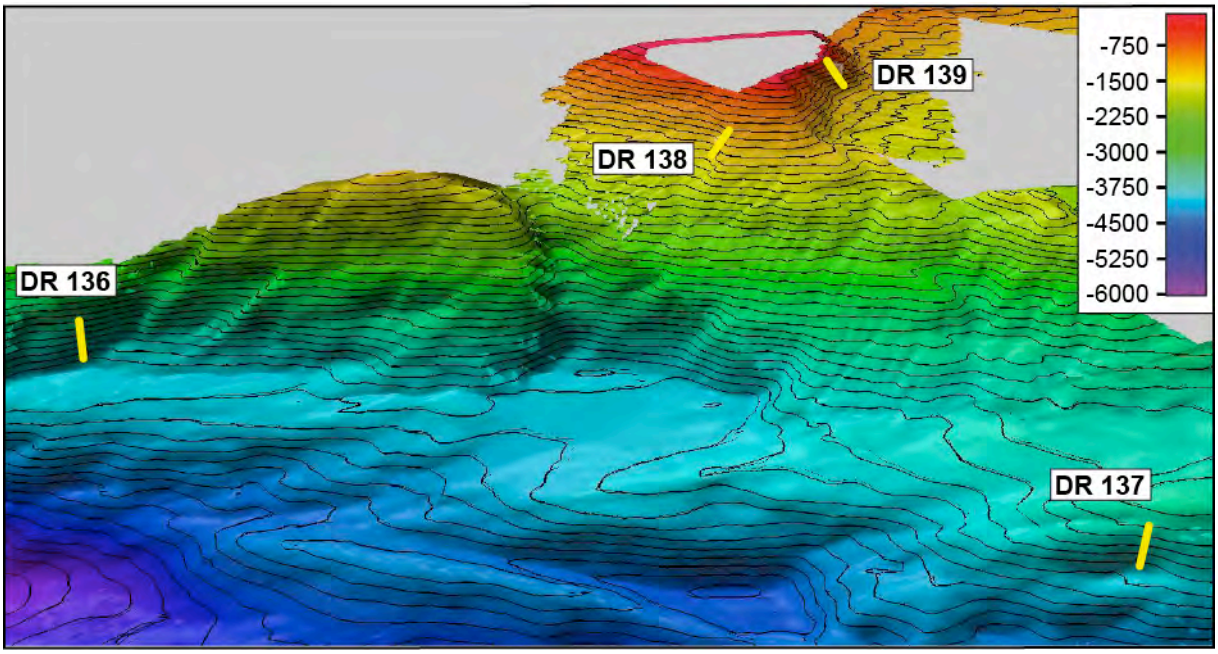


Fig. 7.79: Dredge sites DR136 through 139 at the at the southeastern part of Komandorsky Block (view from SSW to NNE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Dredges 147-148 were taken on the northern flank of the Komandorsky Block, northeast of central Bering Island, in the depth interval 3,508 - 2,476 m (Fig. 7.80). Both dredges were ~30% full and both returned dominantly mafic plutonic rocks - a mixture of texturally diverse diorites (Fig. 7.81) and gabbros. Some are porphyritic. Most have medium to coarse grain sizes but micro-gabbros are also present. Alteration effects are also highly variable, with secondary chlorite and amphibole, and minor sulfide mineralization. Many samples are subject to amphibolization. Some rocks are tectonized / brecciated. Most samples in these dredges are angular. There is abundant material in these dredges for geochemistry, petrography and geochronology.

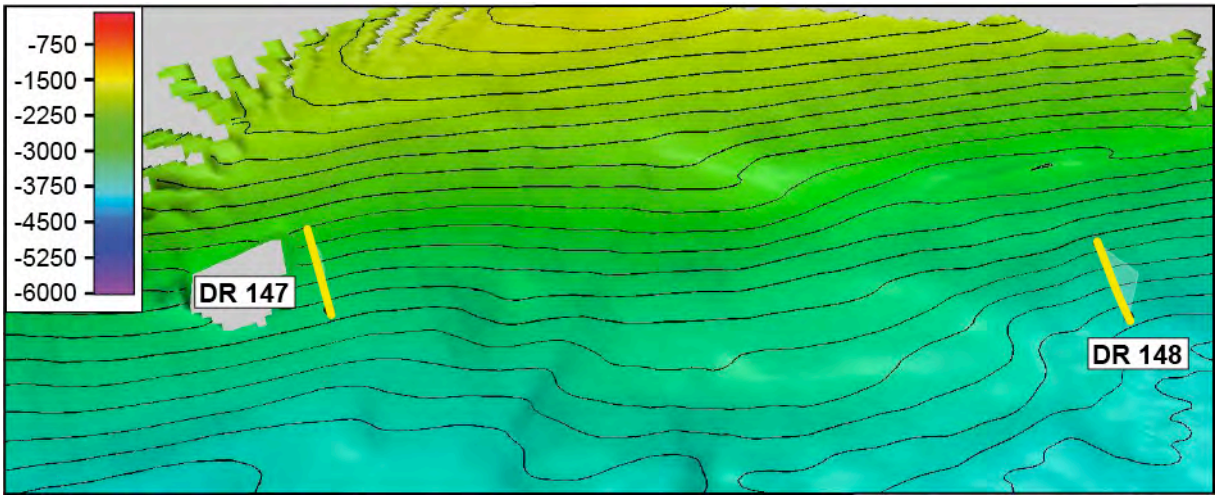


Fig. 7.80: Dredge sites DR147 and 148 at the at the northern flank of the Komandorsky Block (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.81: Plagioclase-Hornblende diorite, the subvolcanic-intrusive equivalent of andesitic lava. From NE slope of Komandorsky block.

Dredges DR149 - 152 were located northwest of Bering Island, on the northeast edge of the Komandorsky Block, on slopes around the Bering Fault zone, including the margins of pull-apart structures, in water depths from 4,672 to 2,947 m (Fig. 7.82). DR149 was ~10% full with a relatively homogenous collection of silt-and-clay sedimentary rocks, some with trace fossils. There were no igneous rocks in this dredge, but volcaniclastic sandstones may provide an opportunity for detrital zircon geochronology. DR150 was 50% full, but it also returned exclusively sedimentary rocks. In this case, the dominant lithology was siltstone, some with sandstone layers. DR151 contained only soft sediments and dropstones – no samples were taken. DR152 was ~30% full and contained a heterogenous mixture of dominantly volcanic rocks, including microdolerite, plagioclase-phyric andesite, basaltic andesite and basalt. Somewhat unusual was the recovery of ignimbrite / welded tuff. Several samples in this dredge are described as 'strongly altered'. Still many samples in DR152 are appropriate for geochemical and petrographic analysis.

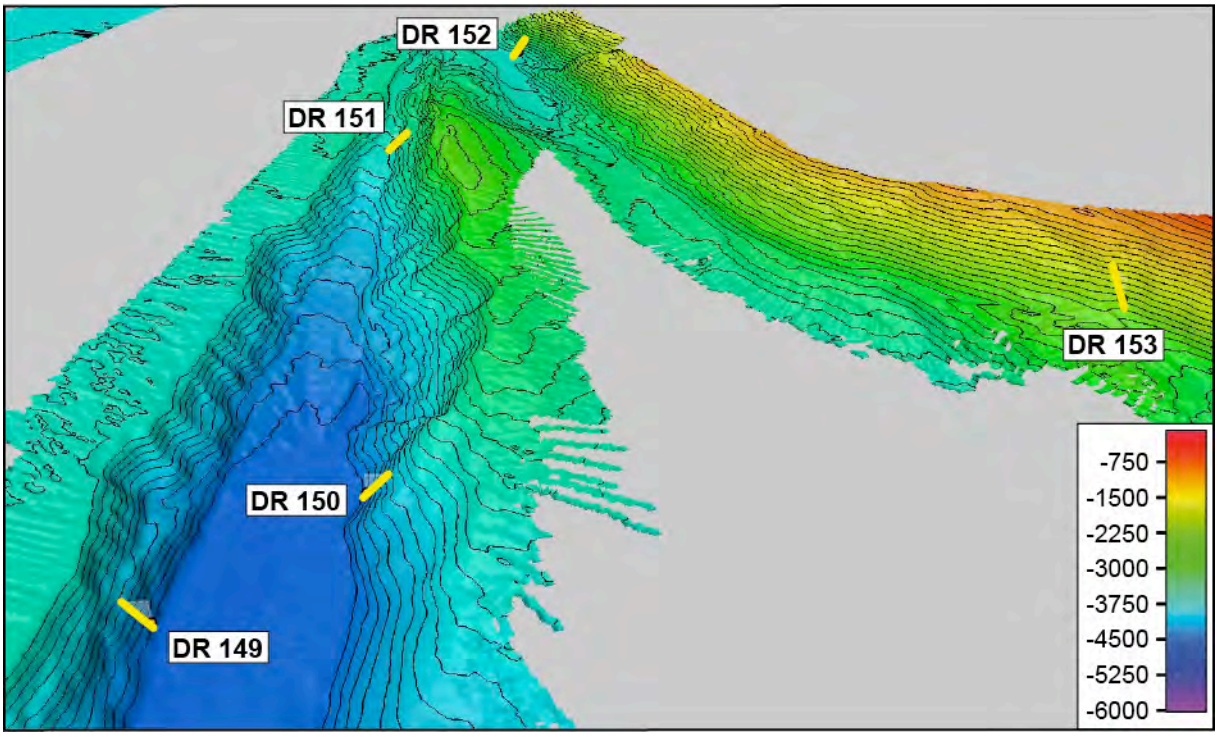


Fig. 7.82: Dredge sites DR149 through 153 at the northwestern section of Komandorsky Block (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.83: Ignimbrite / welded tuff recovered in heterolithological dredge along NW slope of the Komandorsky Block.

Fig. 7.84: Plagioclase-Olivine phyric basalt from NW slope of Komandorsky Block.

Dredges DR153 - 156 were located around the submerged, northwestern-most tip of the Komandorsky Block in the depth interval 4,715 to 1,400 (Figs. 7.82, 7.84, and 7.85). DR153 was 75% full, and contained a diverse mixture of mostly well-rounded volcanic rocks, interpreted to be beach cobbles and pebbles. More than 20 samples of igneous rock were identified from this dredge, which constitute a texturally diverse mixture of basalts (Fig. 7.84) and andesites. Many samples from DR153 are appropriate for geochemical and petrographic analysis. DR154, which was taken in relatively deep water on the SW-facing slope, returned empty. DR155 was 50% full and contained a mixture of mostly mafic lavas as well as a mixture of volcaniclastic breccias. Several samples of olivine-pyroxene-plagioclase-phyric basalt were collected from this dredge. All are appropriate for geochemical and petrographic analysis. Volcanic breccias of two types (with clasts of tuff and with clasts of basalt) were also identified in samples from this dredge. DR156 was 50% full and was mixture of lavas and volcaniclastic breccias. The lavas are texturally diverse, including aphyric, plagioclase-phyric and pyroxene-phyric varieties. Samples from this dredge also include a collection of volcanic breccias. All samples in DR156 show some degree of alteration but many are appropriate for geochemical and petrographic analysis.

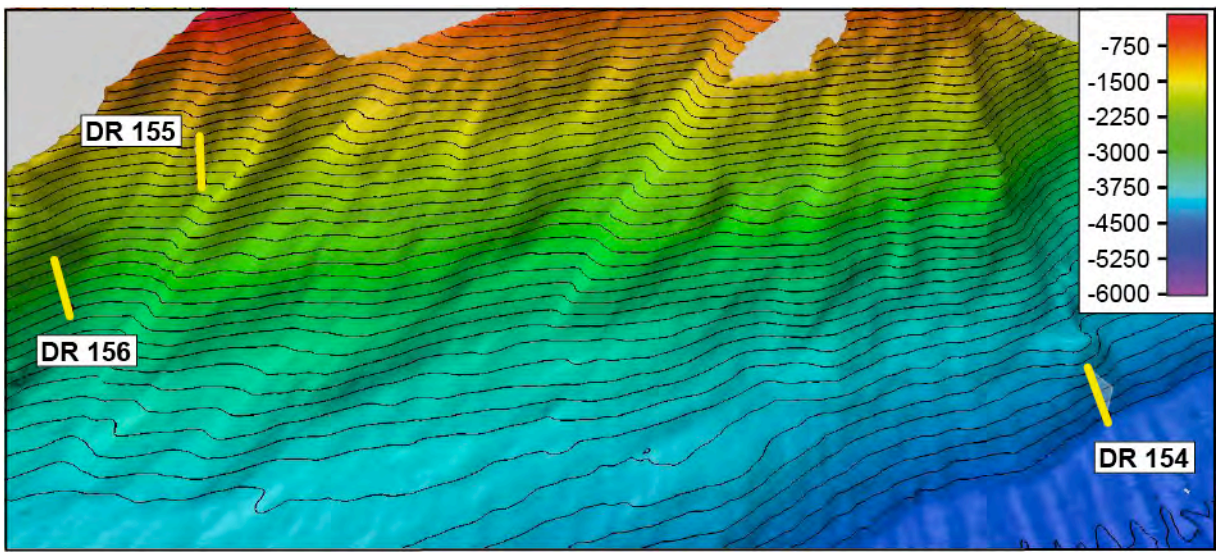


Fig. 7.85: Dredge sites DR154 through 156 at the northwestern tip of the Komandorsky Block (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

7.2.3 Active Volcanism in the western Aleutian Arc

G. Yogodzinski, R. Werner

Dredges summarized here were collected on constructional volcanic features in the Western Cones area, on Piip Volcano, and on the Volcanologist's Massif, which is the platform of mafic rock upon which Piip Volcano was constructed. Also summarized in this section are dredges in the area southeast of Piip Volcano and on the Beta Rise, where young volcanism was suspected prior to the cruise but not identified by mapping and dredging efforts during SO-249.

Western Cones (DR35-38)

Dredges described here were collected on two small cones, each less than 2 km in base diameter, and one large cone, more than 6 km in base diameter (Fig. 7.86), that make up three cones at the southeastern end of the five Western Cones that align along the volcanic front west of Attu Island (see Fig. 7.65).

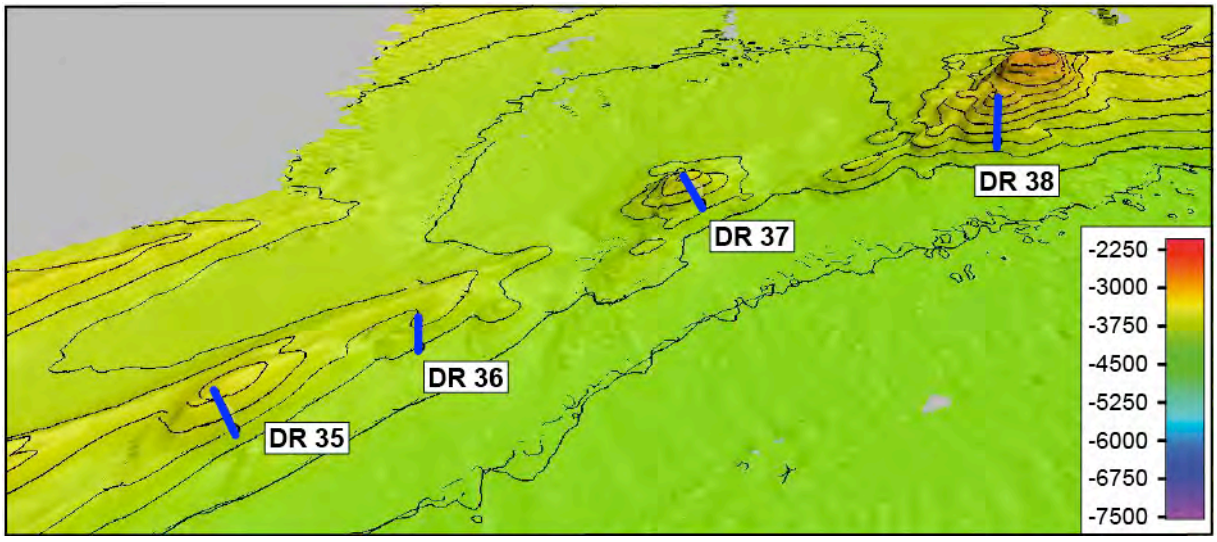


Fig. 7.86: Dredge sites DR35 through 38 at the Western Cones (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.87: Mg-Hornblende phyric rhyodacite from the Western Cones.

DR35 was collected on the southeastern-most of the Western Cones, at 172°12.00´E. This cone was mapped for the first time on SO-249. The dredge was ~30% full, but the main mass of the material was mud. Two subangular fragments of fresh, medium-gray porphyritic and vesicular lava appear similar to one another and are tentatively interpreted to originate from this cone. Dredges DR36 and 37 were collected on a somewhat larger cone located at 172°04,02´E. This feature was mapped in 2009 during SO-201-1b, but not sampled back then. DR36 returned empty but DR37 carried fresh, angular and subangular volcanic rocks of two types. One is hornblende-bearing pillow lava fragment and the second an aphyric lava with irregularly developed vesicles. Both appear to be dacitic in composition, similar to rocks

previously collected from the Western Cones. Dredge DR38 was taken from the largest of the Western Cones, at 171°59,58´E, on a segment of the cone not dredged in 2009. The dredge returned full, and was dominated by angular fragments of dacitic lava (Fig. 7.87), probably similar in composition to high-silica lavas collected in 2009 on SO-201-1b on nearby portions of this cone.

Piip Volcano (DR128-131)

Dredges DR128 through 131 sampled the upper slopes of Piip Volcano (Figs. 7.88 and 7.89). DR128 sampled the north cone at 670-460 m; DR131 sampled the south cone at 712 - 537 m; DR129 sampled a high spot in the saddle between north and south cones 878 - 642 m. DR130 was collected at intermediate depths (904 - 1,129) on the west flank of the south cone. DR128 was full and returned large quantities of fresh, angular olivine-bearing andesite and hornblende bearing andesite and dacite. DR129 was full and returned a large quantity of mud with rock fragments and including a large quantity of white pumice, presumably dacite-rhyolite. Dredges DR130 and 131 were also both full and also returned large quantities of dacite-rhyolite pumice (Fig. 7.90), along with fragments of plagioclase and amphibole-phyric andesite. Large quantities of materials in these dredges are appropriate for geochemical and petrographic analysis.

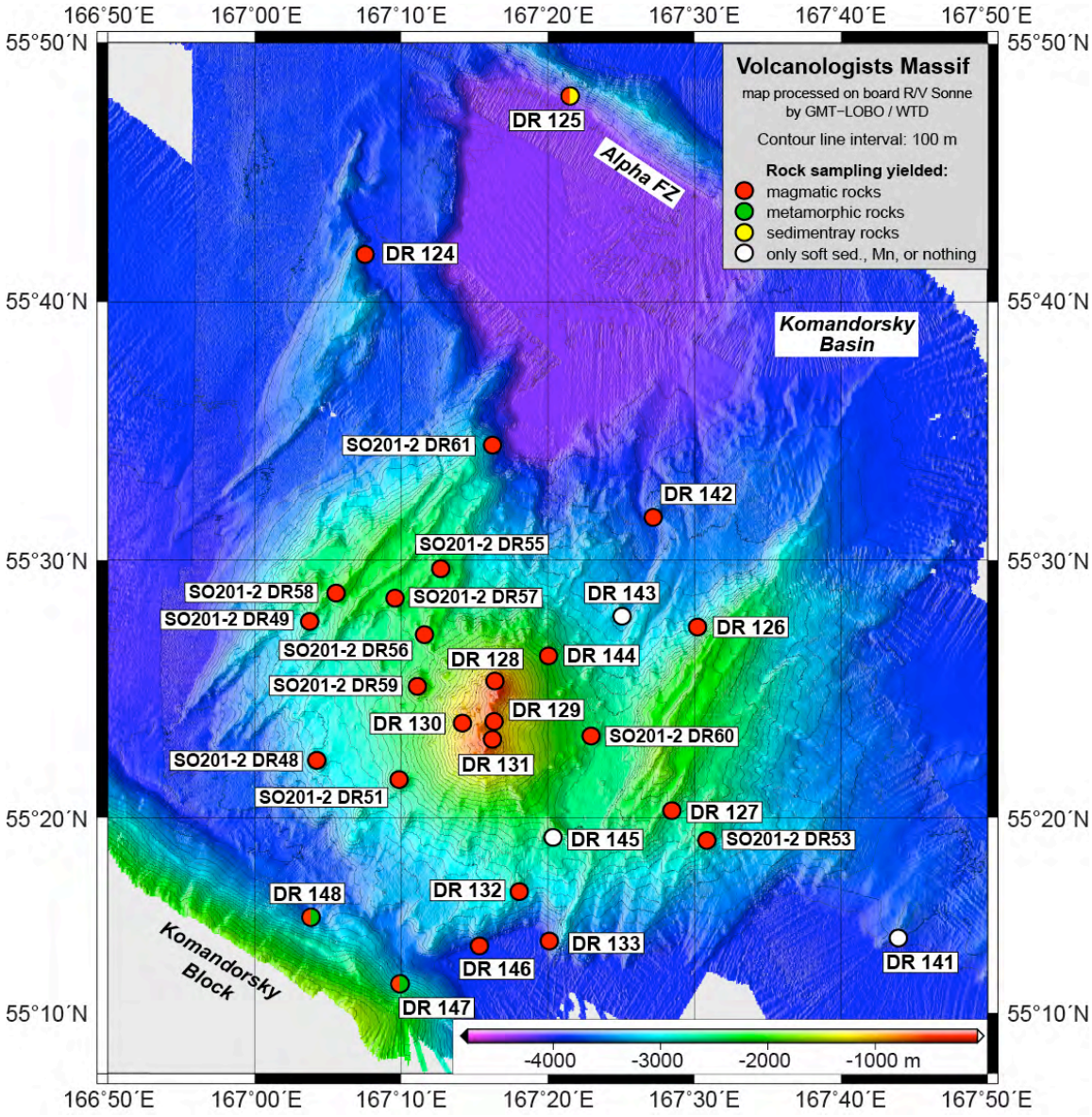


Fig. 7.88: Overview map of the Volcanologist Massif and Piip Volcano based on bathymetric data recorded on R/V SONNE cruise SO-201-2 and SO-249-2.

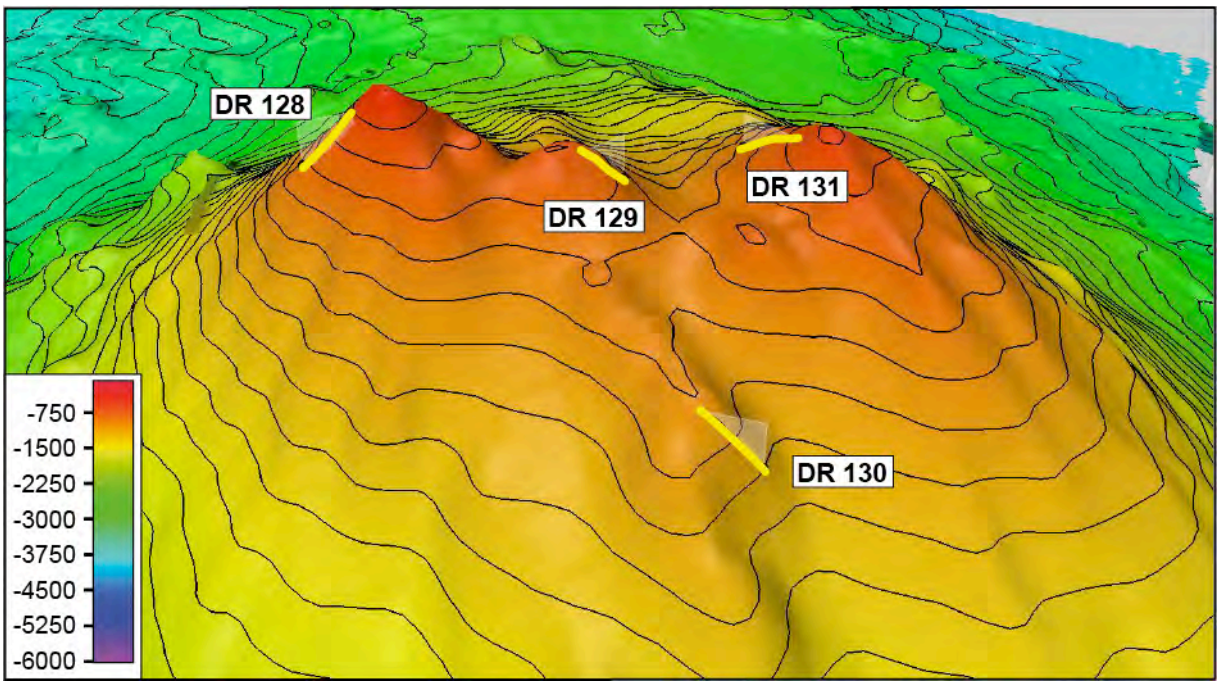


Fig. 7.89: Dredge sites DR128 through 131 in the top area of Piip Volcano (view from W to E). Stereo exaggeration, contours, and data sources as in figure 7.6

Fig. 7.90: Dacitic pumice with <1% clino-pyroxene, orthopyroxene and Plagioclase. From top region of Piip Volcano.

Volcanologist's Massif (DR124, DR126-127, DR132-133, DR142-146)

Dredges on the Volcanologist's Massif (Fig. 7.88) are organized into two groups. These are (1) dredges on structural slopes and (2) dredges on the flanks of small mounds. The structural slopes are formed on the platform upon which Piip Volcano was constructed. In most cases, the mounds appear to be satellite vents, though in some cases, they could actually represent local basement uplifts.

Dredges on structural slopes (DR124, 126-127, 133, 146; Fig. 7.91): DR124 was collected on the east-facing slope of a basement uplift located approximately 34 km northwest of the Piip Volcano summit, at depths of 3,879 to 3,460 m. This dredge returned 25% full with pillow fragments of olivine and plagioclase-phyric basalt, many with significant quantities of fresh glass. Rare, pyroxene-phyric basalts are also present. DR126 was collected on a northwest-facing slope, located 16 - 18 km northeast of the Piip Volcano summit area, at depths from 2,954 to 2,384 m. This dredge returned 75% full with mostly subangular fragments of relatively fresh olivine-plagioclase-phyric and aphyric basalt. DR127 was collected on a southeast-facing slope, located 14-16 km southeast of the Piip Volcano summit area, at depths from 2,548 to 2,158 m. This dredge returned 50% full with mostly pillow fragments up to 0.5 m long. Minor hyaloclastite was also present in this dredge. The pillow fragments are mostly olivine-plagioclase-phyric and plagioclase-phyric basalts (Fig. 7.92). This dredge also returned

significant quantities of only slightly altered pumice, which is light-colored and presumed to be dacite-rhyolite. DR133 was collected on a west-facing slope, located 15-17 km southeast of the Piip Volcano summit area, at depths from 3,782 to 3,271 m. This dredge returned full, with many pillow fragments, columnar lava and hyaloclastite. The main lithologies are pyroxene-olivine-plagioclase basalt and possibly andesite. Many fragments have chilled, glassy margins. Most samples appear fresh. DR146 was collected on a southeast-facing slope, located 16 - 18 km south of the Piip Volcano summit area, at depths from 3,934 to 3,454 m. This dredge returned only a few rocks. Nonetheless, 17 rock samples were identified from this dredge. The main rock type is olivine-phyric basalt (Fig. 7.93). Some samples are pillow fragments and some show signs of alteration but also including samples of fresh glass.

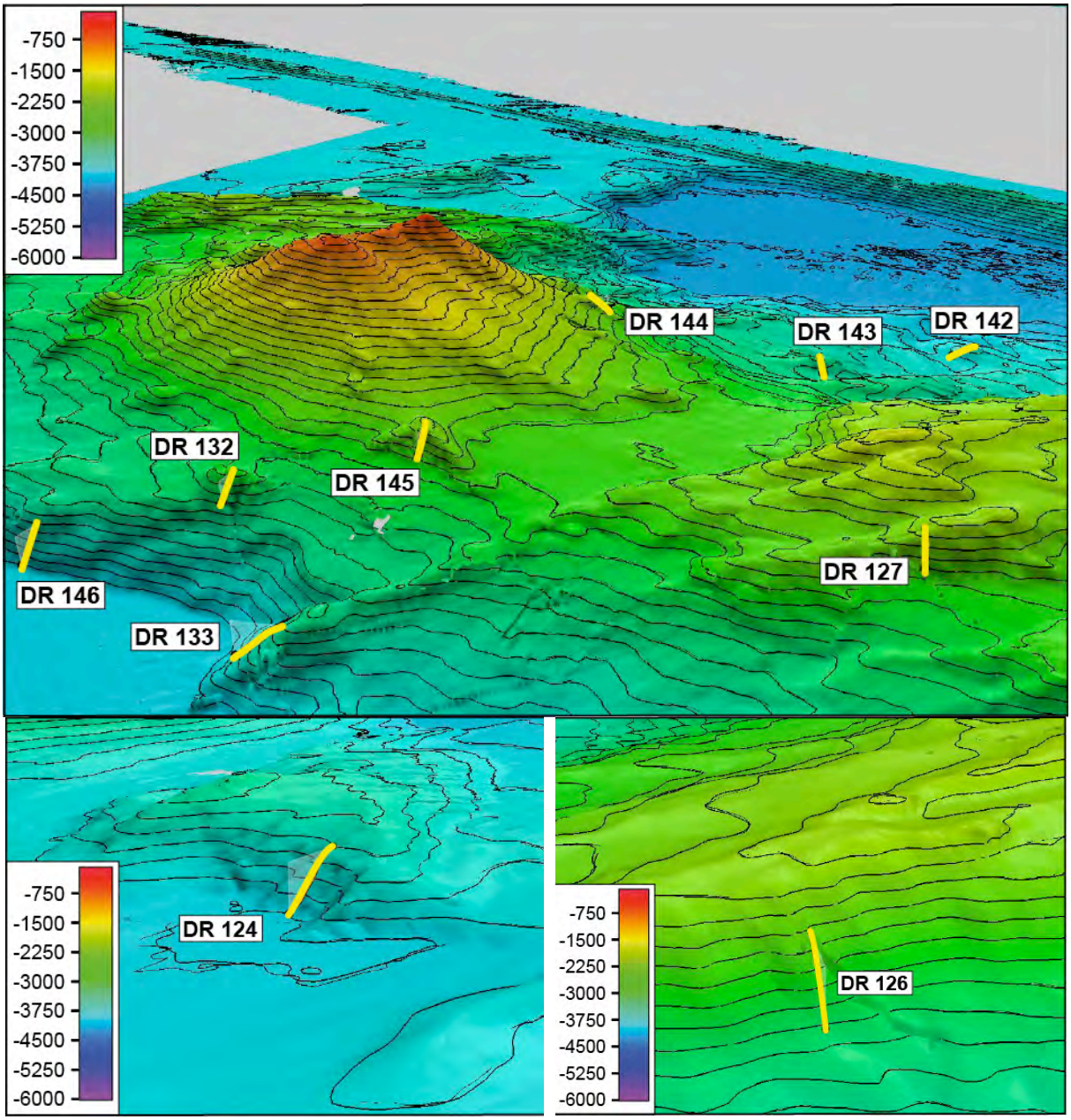


Fig. 7.91: SO-249 dredge sites DR124, 126, 127, 132, 133, and 142 - 146 at Volcanologists Massif (view from SE to NW for large map, from NE to SW for DR124, and from N to S for DR126). Stereo exaggeration, contours, and data sources as in figure 7.6

Dredges on the flanks of mounds (DR132, 142-145; Fig. 7.91). DR132 was collected on the flank of a small mound, located 12 - 13 km south of the Piip Volcano summit area, at depths from 3,036 to 2,607 m. The dredge returned 20% full. Most samples are fragments of olivine-phyric basalt, often with glassy margins. Dredges 142 and 143 were located on the flanks of small mounds located 12 - 20 northeast of the Piip Volcano summit area, in water depths

3,737 - 3,116 m. DR143 returned empty and DR142 returned nearly empty, except for a fragment of fresh basalt and a volcaniclastic rock, also relatively fresh. DR144 was located on the flanks of a mound on the lower slope of the Piip north cone, in water depths from 2,326 to 2,020 m. This location appears to be a Piip Volcano satellite vent. This dredge returned full, including several large blocks, up to 1 m long. The main rock type is an olivine-amphibole andesite (Fig. 7.94). Some samples are also pyroxene-phyric. All samples are angular and appear fresh. DR145 was located on the flanks of a mound at the base of the Piip south cone, 9 - 10 km from the summit area, in water depths from 2,592 to 2,251 m. This location appears to be a Piip Volcano satellite vent, however the dredge returned empty.

Fig. 7.92: Olivine-Plagioclase phyric pillow lava from the easternmost ridge of the Volcanologists Massif. Red arrow points to glassy chilled margin.

Fig. 7.93: Sheet flow lava with pahoe-pahoe surface. From the very base of the Volcanologist Massif South of Piip.

Fig. 7.94: Olivine-Hornblende-Plagioclase phyric andesitic pillow from a mound along the northern base of the Volcanologists Massif.

Area Southeast of Piip Volcano (DR140-141).

DR140 was located east of the Piip Volcano summit area a distance of 52 - 54 km. DR141 was also located east of the Piip, a distance of 32 - 34 km (Figs. 7.88 and 7.95). DR140 returned a few rocks, including one sample of subangular, moderately altered olivine-plagioclase-phyric basalt (Fig. 7.96). This sample appears appropriate for geochemical and petrographic analysis. DR141 was effectively empty.

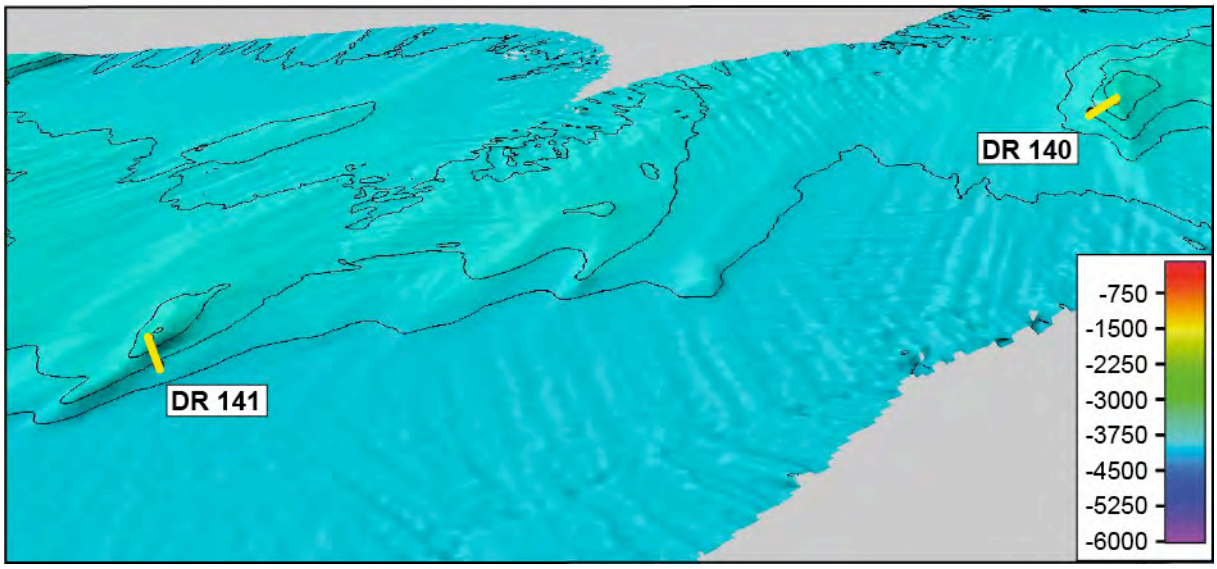


Fig. 7.95: Dredge sites DR140 and 141 southeast of the Volcanologists Massif (view from SSW to NNE). Stereo exaggeration, contours, and data sources as in figure 7.6

Fig. 7.96: Moderately altered olivine-plagioclase basalt from area southeast of the Volcanologists Massif.

Beta Rise Area (DR117-119)

The area of the Beta Rise is characterized by a distinct heat flow anomaly. Our studies in this area aimed to test the idea that this anomaly may be associated with recent volcanism. However, apart from the few already known bathymetric highs, only three additional small features were discovered on cruise SO-249. Three dredges were collected at these small, up to only 500 m high features in the depth interval 3,591 to 2,557 m (Figs. 7.97 - 7.99). DR117 returned 15% full but mostly with mud, dropstones and a large, subangular block of sedimentary rock. DR118 returned semi-consolidated sediment and a few rocks, including some fragments of mudstone and a Mn nodule, but no igneous samples considered to be *in-situ*. DR119 was 25% full, mostly with mud, semi-consolidated sediment and numerous pebbles and fragments of metamorphic and sedimentary rock. Two volcanic rock fragments in DR119 are tentatively interpreted to be *in-situ*. These are both relatively fresh, angular fragments of plagioclase-olivine-phyric basalt. These samples appear appropriate for geochemical and petrographic analysis.

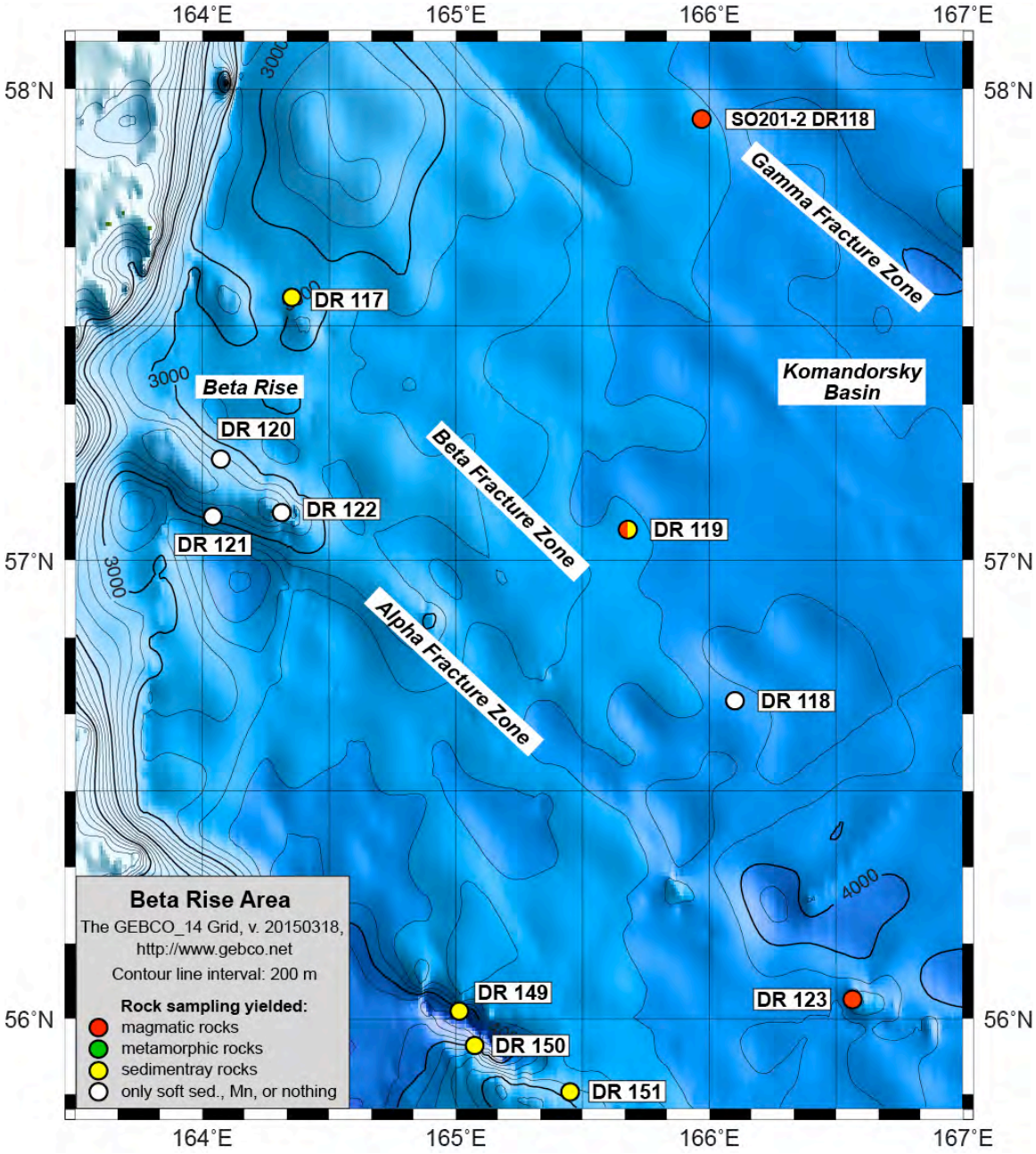


Fig. 7.97: Overview map of the Beta Rise Area.

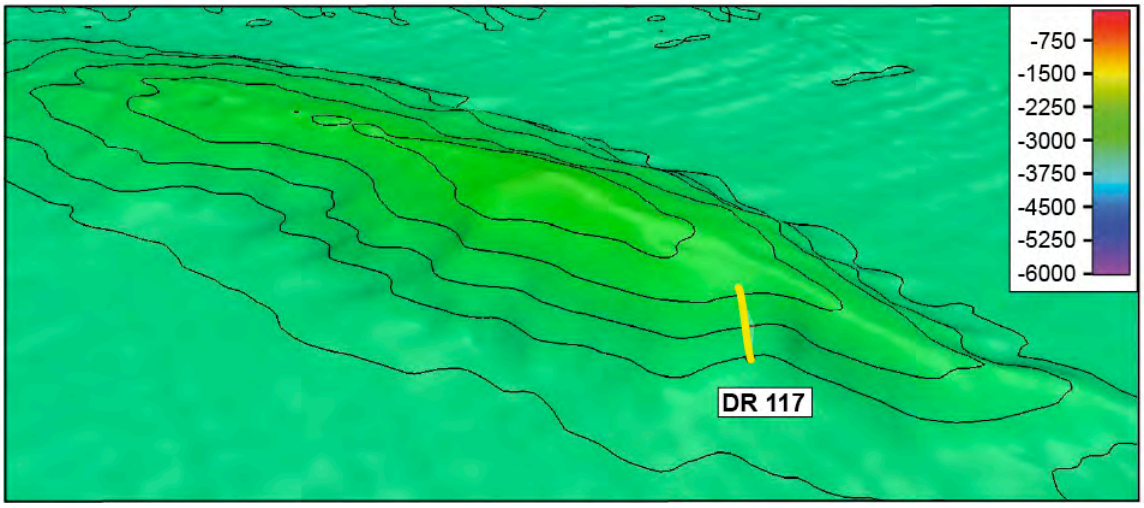


Fig. 7.98: Dredge site DR117 in the Beta Rise area (view from NNW to SSE). Stereo exaggeration, contours, and data sources as in figure 7.6

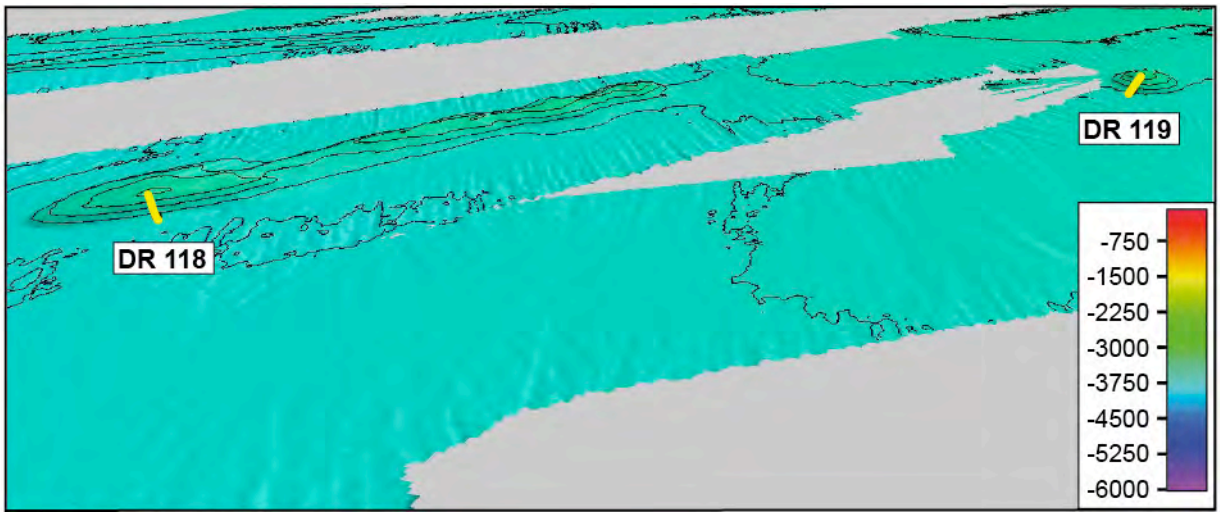


Fig. 7.99: Dredge sites DR118 and DR119 in the Beta Rise area (view from ENE to WSW). Stereo exaggeration, contours, and data sources as in figure 7.6.

7.2.4 Pre- and early Arc History

M. Portnyagin, V. Ponomareva, R. Werner

This chapter describes mainly results obtained during investigations along the Beringia-Chukotka Margins and in the Central Shirshov Ridge areas framing the Aleutian Basin from the north and west and thus representing magmatic and metamorphic complexes formed prior to the inception of the Aleutian Arc and possibly coincident with the opening of the Komandorsky Basin. The data on the composition and age of the basement in these areas are relatively scarce and include 51 - 54 Ma calc-alkaline arc lavas dredged from the Beringia Margin in the western part of the Aleutian Basin (Davis et al., 1989; Moll-Stalcup and Arth, 1989), 65 - 69 Ma calc-alkaline volcanic rocks dredged in the axial part of Shirshov Ridge in 2009 during SO-201 KALMAR cruise (KALMAR team, unpublished data) and ~72 Ma metagabbros with the age of metamorphism of 47 Ma dredged in the Central Shirshov Ridge (Sukhov et al., 2011). The previous results indicate possible occurrence of basement outcrops in these areas which were not studied before. Particular interest is also caused by numerous enigmatic “seamounts” on the Chukotka-Beringia Margin, which could represent uplifted blocks of basement, young volcanic structures or artefacts of predicted bathymetric data.

Beringia Margin (DR106-108)

Beringia Margin as revealed by the GEBCO data ('The GEBCO_2014 Grid, version 20150318, http://www.gebco.net') is a gently steeping slope of the Aleutian Shelf towards the Aleutian Basin. In the southern part of the working area the slope has two structural levels with the lower plateau terrace advancing in southern direction (Fig. 7.100). Bathymetric survey during SO-249 along the edge of the lower plateau revealed a south-west dipping, gentle slope dissected by numerous valleys, sometimes with relatively steep 25 - 30^{o} slopes over 300 - 400 meters surface distance (Fig. 7.101). Dredging was performed at three stations (DR106, DR107 and DR108) located at the lower parts of valley slopes representing the deepest possible depths in this area. All dredges yielded similar type of semi-consolidated clay with abundant bivalve worm holes (Fig. 7.102) as well as abundant mud samples in sediment traps and ice-rafted debris (drop-stones). Mapping along the northern part of the shelf slope to the junction with the Chukotka Margin displayed gentle relief and no structural features suitable for dredging. In summary, our survey did not reveal outcrops of hard rock basement in this area where the slope appears to be entirely covered by young semi-consolidated sediments.

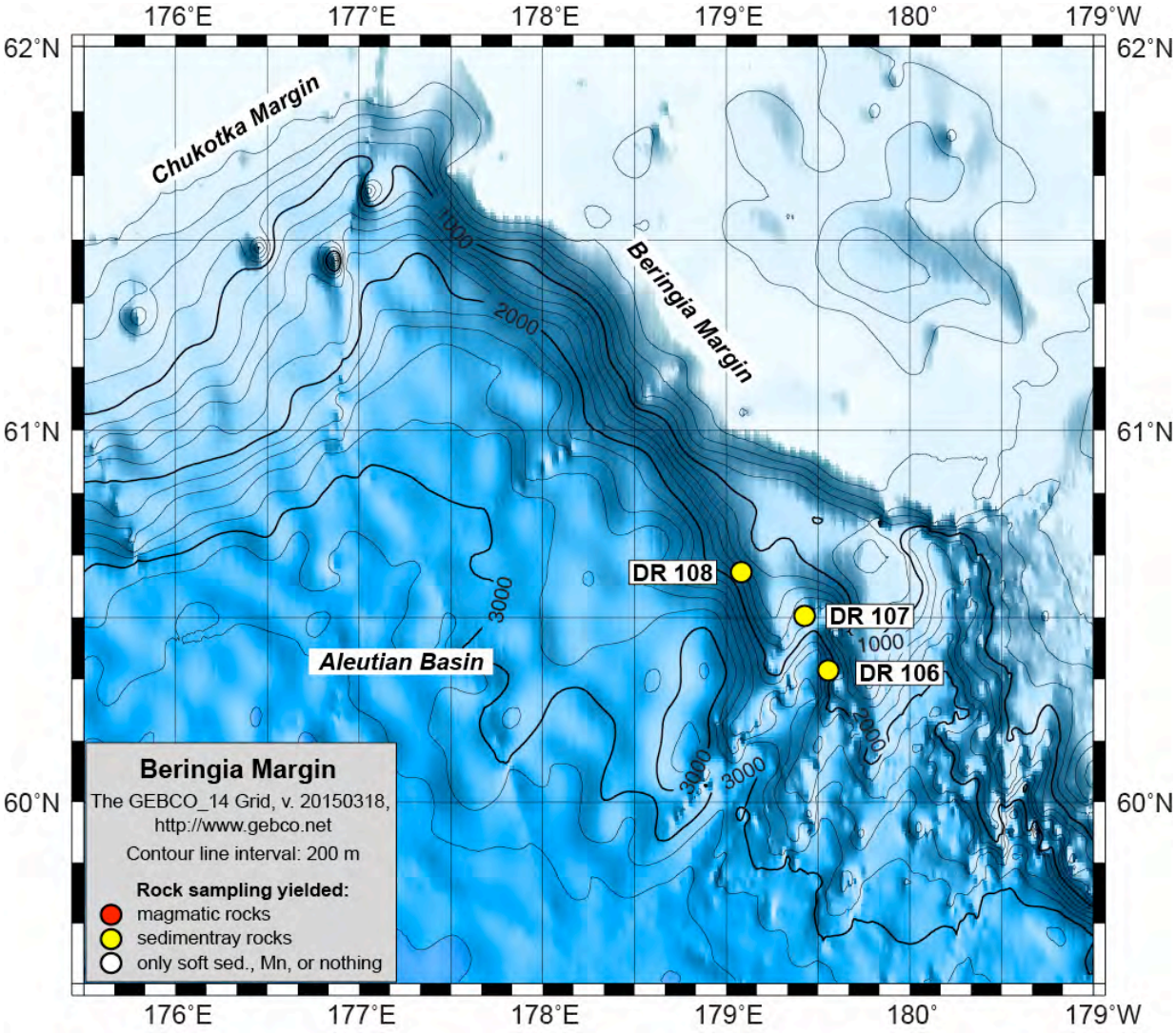
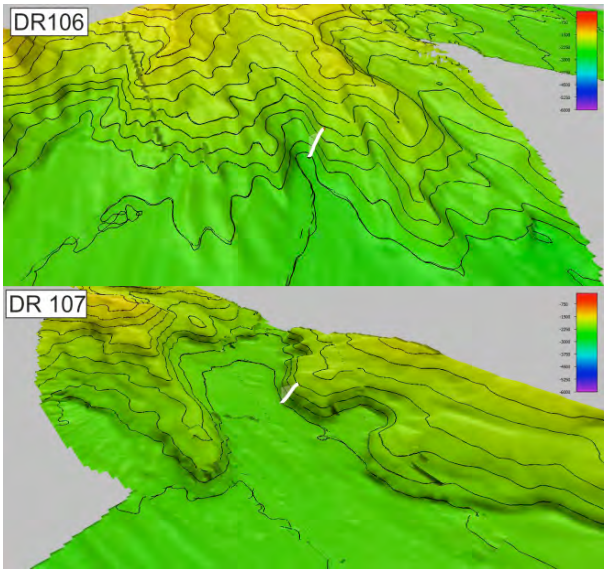


Fig. 7.100: An overview map of the Beringia Margin and the northern part of Chukotka Margin working areas and dredge locations.



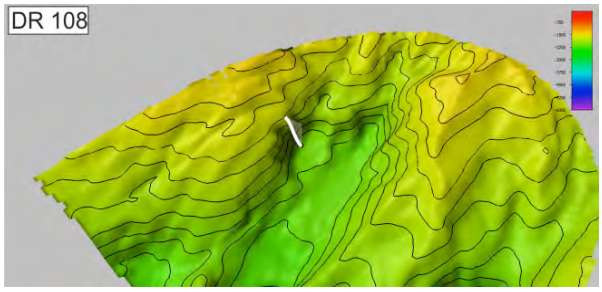


Fig. 7.101: Detailed bathymetric data of dredge locations at the Beringia Margin (view from NW to SE for DR106, SE to NW for DR107, and SW to NE for DR108). Stereo exaggeration, contours, and data sources as in figure 7.6.

Fig. 7.102: Semi-consolidated sediment – clay with abundant bivalve warm holes dredged at station DR107 (sample DR107-1B).

Chukotka Margin (DR109-111)

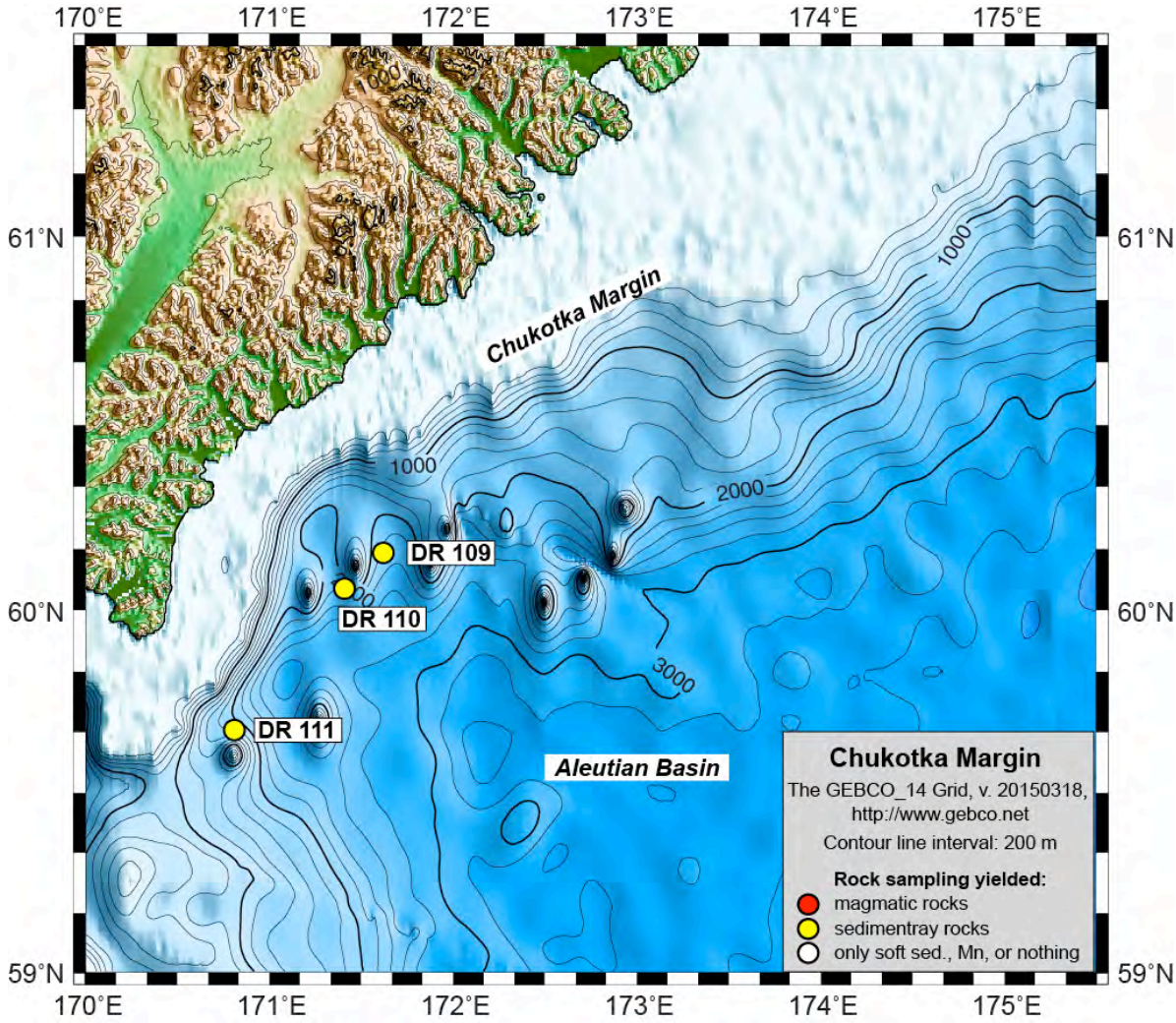


Fig. 7.103: An overview map of the Chukotka Margin working area with dredge locations.

Bathymetric survey along the northern part of the Chukotka Margin shelf near its junction with the Beringia Margin revealed rather smooth seafloor topography. Prominent seamount-like objects predicted on the sea-floor by GEBCO data (Fig. 7.103) proved non-existent or represent slope unevenness. In the southern part of the working area, the Chukotka shelf

slope is steeper, dissected by numerous canyons and split into small ridges separated by broad valleys. The general pattern of the seafloor bathymetry in this area is likely determined by a series of NW-SE trending faults, which appear to be traceable on land, and tilted crustal blocks associated with the faults. Dredging was performed at three stations (DR109, DR110, and DR111) at the lower parts of ridge slopes (Figs. 7.103 and 104). The dredges yielded variably consolidated sandy and silty clays (DR109, 110, 111) some with worm holes, conglomerate (DR109) as well as unconsolidated mud in sediment traps. In summary, the investigations along the Chukotka Shelf did not reveal outcrops of basement rocks. The area at the junction with Shirshov Ridge has likely experienced relatively recent tectonic deformations displayed by faults and tilted crustal blocks.

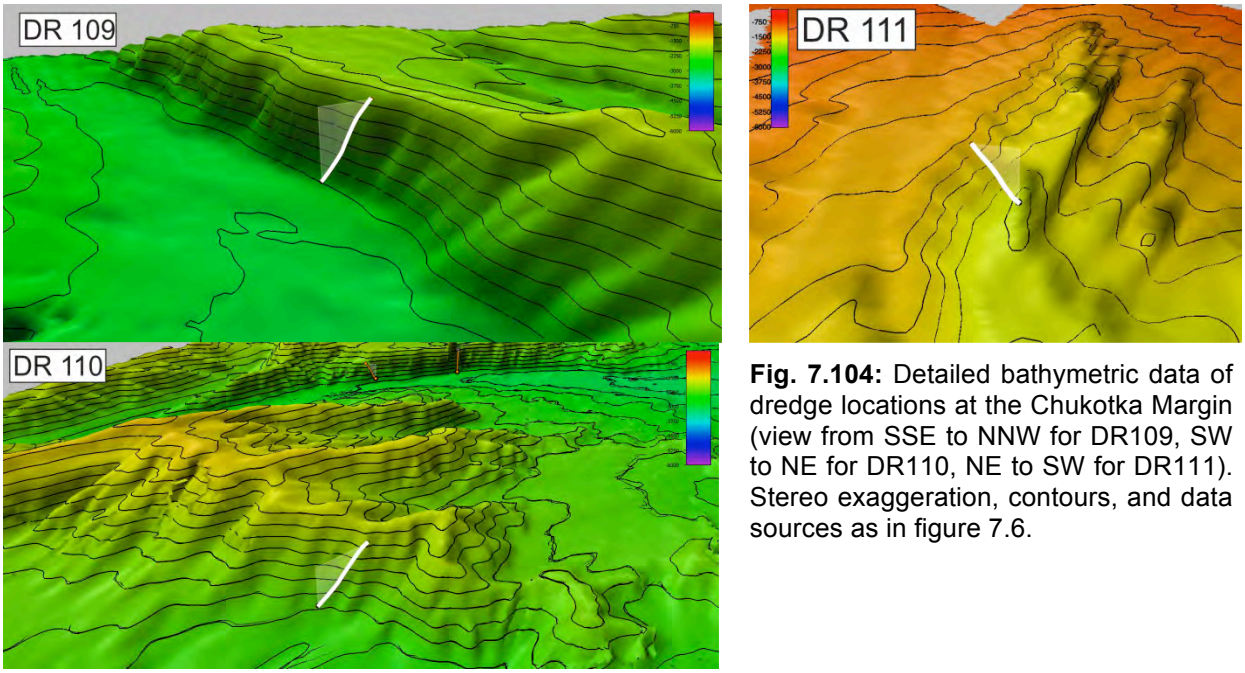


Fig. 7.104: Detailed bathymetric data of dredge locations at the Chukotka Margin (view from SSE to NNW for DR109, SW to NE for DR110, NE to SW for DR111). Stereo exaggeration, contours, and data sources as in figure 7.6.

Central Shirshov Ridge (DR112-115)

The central Shirshov Ridge area is known for prominent outcrops of diverse metamorphic rocks that were first discovered in 1982 during the 29th cruise of R/V Dmitrii Mendeleev (Silantyev et al., 1985; Sukhov et al., 2011) and revisited during SO-201-2 KALMAR expedition in 2009. SO-249 work aimed at completing bathymetric mapping of this area and additional sampling (Fig. 7.105).

The SO-249 bathymetric survey revealed a series of at least four oval shaped, E-W elongated structures that appear to be fault bounded crustal blocks and are mantled by semi-consolidated sediments (Figs. 7.106 and 7.107). Unlike the crustal blocks, the sediments, which have been dredged at station SO-201-2-DR107 in 2009, are dissected by numerous small canyons. Previous efforts and additional dredging during SO-249 confirmed that the large oval shaped crustal blocks are composed of diverse metamorphic rocks.

Dredge DR112 at the northeastern steep flank of the northernmost block delivered a large variety of rocks. The predominating type are ultramafic rocks with variable proportions of olivine over orthopyroxene and range from dunites through harzburgites to orthopyroxenites (Fig. 7.108). Orthopyroxene and spinel are fresh in some samples, olivine – altered to serpentine and Fe-hydroxides. All samples have very thin Fe-Mn hydroxide films on their surfaces, indicating limited exposure times to seawater. Outer surfaces of many samples expose "slick and slide" fabrics reflecting intense brittle deformation, presumably imprinted during uplift and/or later faulting of this block. Other rocks of the dredge represent diverse metamorphics: amphibolites after basalt, dolerite and gabbro, greenschists with likely sedimentary protolith (Fig. 7.108). Dredge DR113 at the southern flank of the 3rd block (counting from north to south) did not recover basement rocks but just semi-consolidated mud. Dredge DR114 at the northern slope of 4th block brought up relatively uniform greenschists

with possible siliceous to more mafic tuff protoliths, similar to those obtained from the 2nd block during SO201-2 expedition (Dullo et al., 2009).

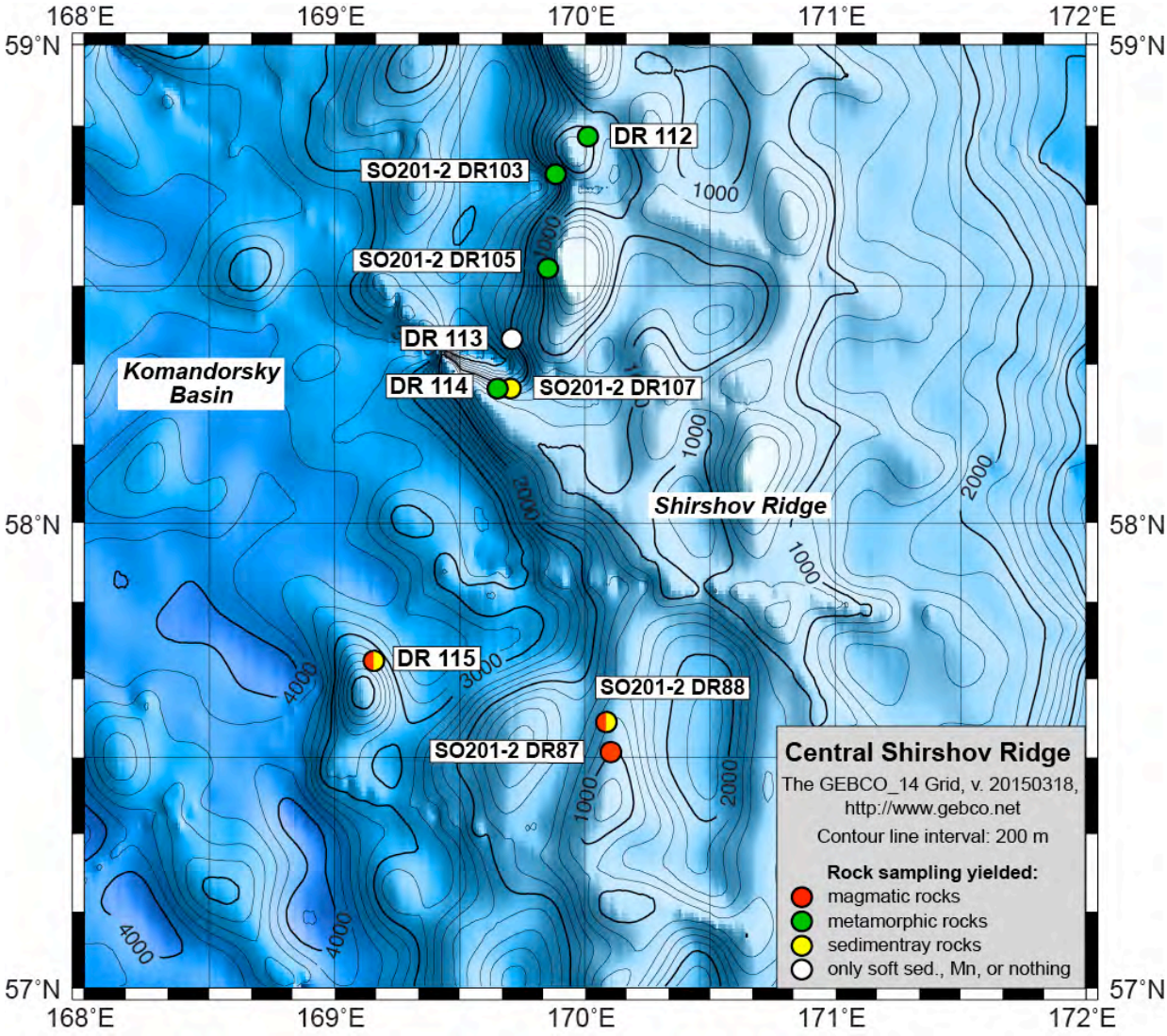


Fig. 7.105: An overview map of the Central Shirshov Ridge working area with SO-249 and SO-201-2 dredge locations.

In summary, our new mapping and dredging campaign revealed several faulted metamorphic blocks at the western slope of the central Shirshov Ridge. Diverse types of the rocks range from mantle peridotites and pyroxenites to metasediments representing a full spectrum of rocks comprising oceanic lithosphere, metamorphosed under amhibolite facies conditions. This part of Shirshov Ridge can be interpreted as potentially related to low angle detachment faulting similar to inner corner highs at transform faults (Komandorsky spreading?) which are known to bring up mantle rocks or to "basin and range" type crustal extension (when Creatceaous arc rifted from the Siberian margin?). The alternative explanation would be a westward directed thrust fault to bring up the lithosphere section from the east. In the latter case the rocks may represent either Cretaceous arc complex (e.g., Tethys-type suprasubduction zone ophiolite) or oceanic-type Bering Sea lithosphere (captured Kula plate). The latter interpretation has been favored by the earlier investigations (Silantyev et al., 1985; Sukhov et al., 2011) though strong metamorphic imprint makes geochemical fingerprinting somewhat uncertain. New geochemical investigations and absolute dating of these rocks should help to resolve the provenance of the rocks that is crucially important for the reconstruction of the Bering Sea evolution.

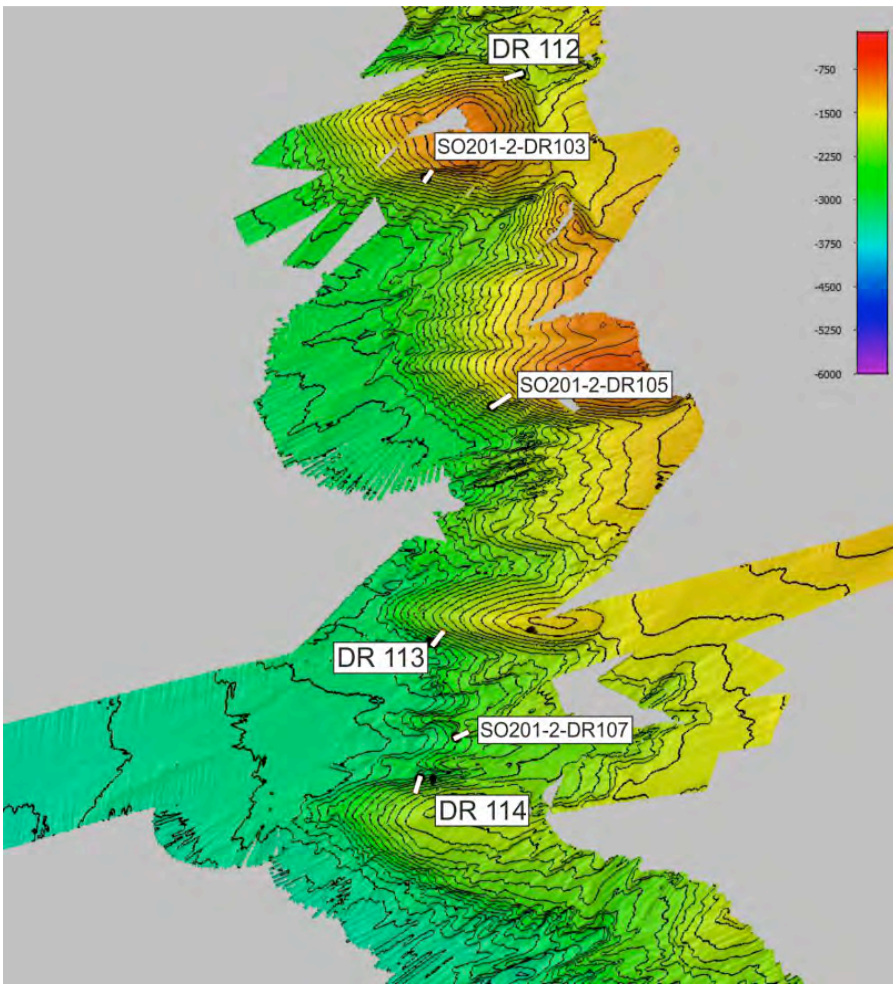


Fig. 7.106: Detailed bathymetric data and dredge locations at the central Shirshov Ridge area. Stations DR112, DR113 and DR114 are located at the western slope Shirshov Ridge. Stations made in 2009 during SO-201-2 KALMAR expeditions are shown for reference (SO-201-2-DR103, -DR105 and -DR107) (view from SSW to NNE). Stereo exaggeration, contours, and data sources as in figure 7.6.

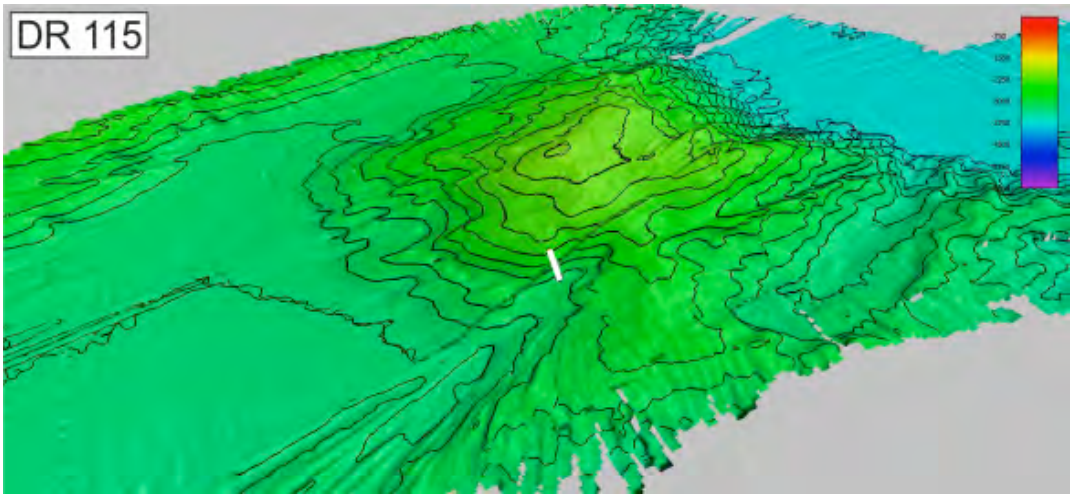


Fig. 7.107: DR115 on the northern end of south-north trending ridge at the western Shirshov Ridge slope (view from NE to SW). Stereo exaggeration, contours, and data sources as in figure 7.6.

Additional mapping and dredging was performed to the west from SO-201-2 stations DR87 and DR88 in the axial part of the central Shirshov Ridge which yielded 65 - 69 Ma arc type basalts and dacites. The SO-249 station DR115 was made at the northern end of north-south trending ridge at the western slope of Shirshov Ridge (Figs. 7.105 and 7.107). The dredge brought mostly unconsolidated sediments with a few fragments of hard rocks. Two of the fragments are preliminary described as dacite volcaniclasics and may potentially represent *in-situ* rocks, taking into consideration results of the SO-201-2 expedition.

Fig. 7.108: Representative samples obtained from the central Shirshov Ridge working area: a) DR112-4 – harzbirgite, b) DR112-9 – orthopyroxenite, c) DR112-12 – metadolerite, d) DR112-14 – melanocratic metagabbro, e) DR112-15 – leikocratic metagabbro, f) DR112-17 – para-amphibolite, g) DR114-1 – green-schist, h) DR115-2 – dacitic (?) metatuff.

Alpha Fracture Zone (DR120-123, DR125)

One of the most remarkable features of the Komandorsky Basin basement is the occurrence of NW-SE – striking fracture zones (FZ) which can be traced from the continental slope of the Kamchatka Peninsula to the Shirshov Ridge (Alpha, Beta, Gamma, and Delta FZ, Fig. 7.97). These fracture zones are mostly buried under sediments with exception of the northwestern segment of the Alpha FZ that is expressed on the seafloor as a 600 to 700 m high ridge, and the western part of the Gamma FZ, where it forms an isolated elongated seamount which has been successfully sampled on cruise SO-201-2 (Dullo et al. 2009). However, sampling of magmatic rocks from the Alpha FZ on cruise SO-201-2 (station DR63) failed and yielded only silty sandstones and fragments of Mn-crusts. Therefore several attempts has been made on cruise SO-249 to sample Komandorsky crust at the Alpha FZ (Figs. 7.75, 7.97, 7.109, and 7.10).

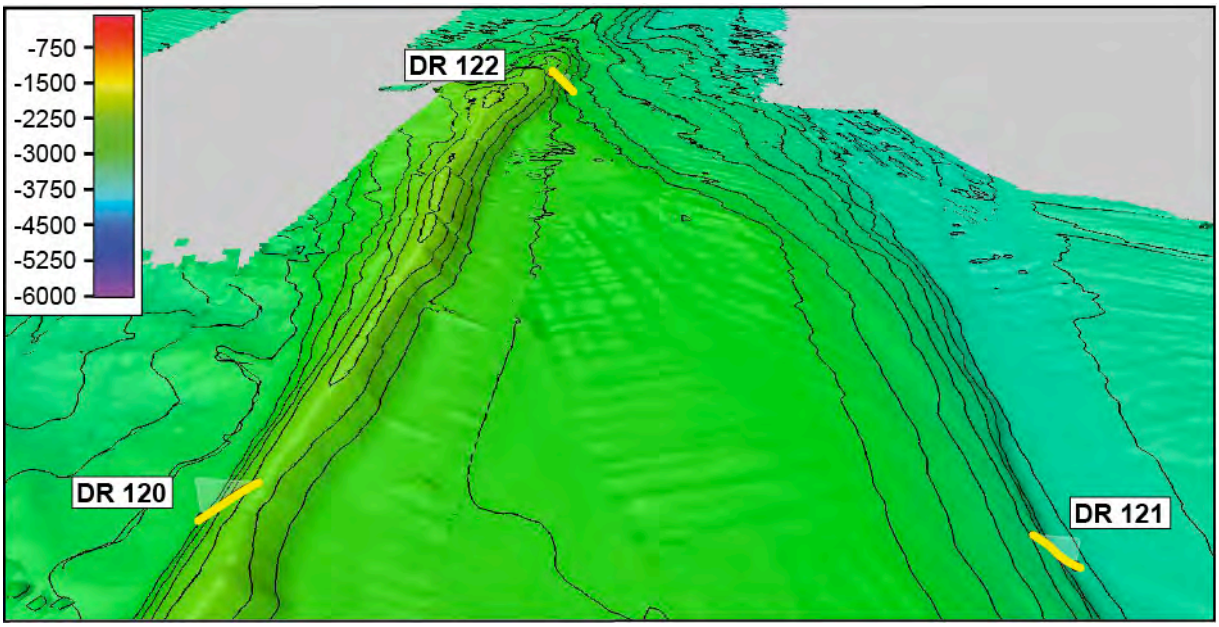


Fig. 7.109: DR120 through 122 at the northwestern tip of the Alpha FZ (view from WNW to ESE). Stereo exaggeration, contours, and data sources as in figure 7.6.

Dredges DR120 through 122 have been carried out at the northwestern tip of the Alpha FZ in water depths between 3,300 and 2,400 m (Fig. 7.109). DR120 recovered only semi-consolidated sediments, dropstones, manganese nodules, and mud and DR121 failed to return any rocks. DR122 yielded semi-consolidated sediments among abundant enigmatic ancient wood fragments. A possible explanation for the occurrence of the wood at this site may be that the Kamchatsky Peninsula has experienced many tectonic-driven events (including earthquakes) and tsunamis related to interaction of Bering and Okhotsk blocks (e.g., Bourgeois et al., 2006), crustal faulting reflecting collision of the Kamchatka and Aleutian arcs (e.g., Kozhurin et al., 2014), and massive landslides from the coastal areas (Melekestsev, 1995). Wood and soil can be transported offshore by tsunamis, landslides, mud flows, or rivers. The site of the wood cemetery, however, is located suspiciously close to the opening of the Pokaty canyon direction which follows an active right-lateral strike-slip fault (Kozhurin, 2011). One of the plausible scenarios of the wood delivery to this site therefore is a landslide or mudflow generated by a faulting event.

DR123 was made from 3,800 to 3,300 m b.s.l. a section of the Alpha FZ which is located northwest of the Volcanologists Massif (Figs. 7.75. and 7.110) and yielded mainly dropstones. Only one magmatic rock found in this dredge (tuff or aphyric lava) may be of *in-situ* origin. Dredge haul DR125 has been conducted next to the SO-201-2 dredge site DR63 at the southern flank of the Alpha FZ section north of the Volcanologists Massif (Figs. 7.75. and 7.110). The dredge recovered a wide range of rock fragments including *in-situ* volcaniclastic breccia and (sub)volcanic rocks which are probably appropriate for geochemical analyses.

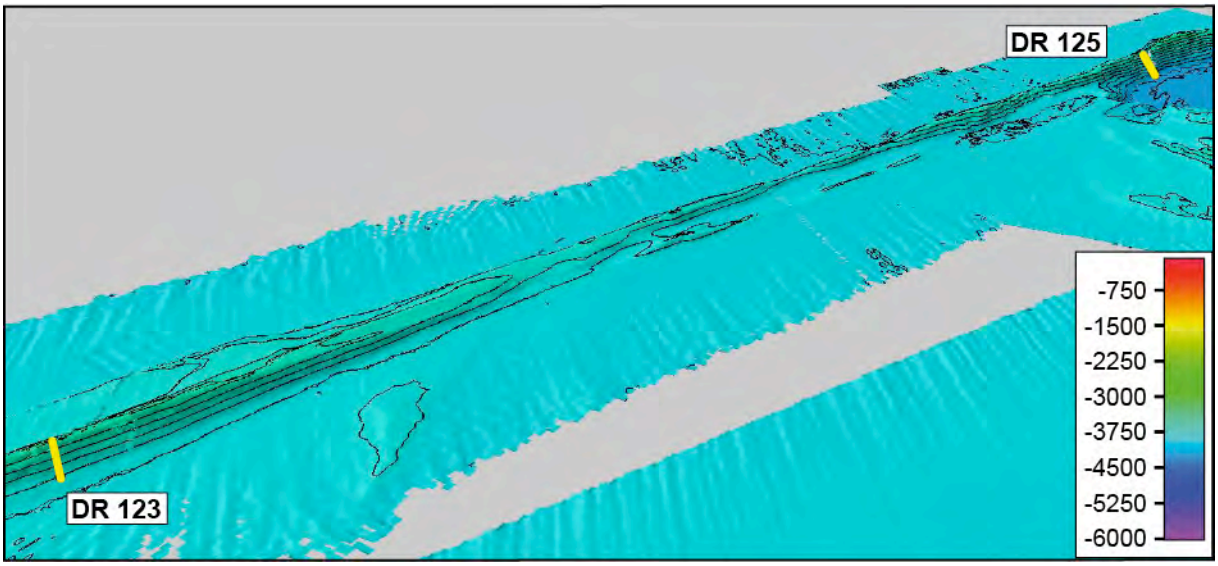


Fig. 7.110: DR123 and 124 at section of Alpha FZ which is located northwest and north of the Volcanologists Massif (cf. Fig.7.75) (view from SW to NE). Stereo exaggeration, contours, and data sources as in figure 7.6.

7.3 BIOLOGICAL SAMPLING

A. Ziegler

7.3.1 General Observations

Because the cruise track was chosen according to the necessities of geological sampling, retrieval of biological specimens was restricted to localities consisting primarily of rocky habitats, mostly with a steep slope. However, in some areas – in particular in the northern and western parts of the Bering Sea – the benthos was composed of consolidated sediment (see Appendix II). The shallowest dredging (SO249-DR135) was conducted at 344 m water depth on an unnamed guyot southeast of Medny Island, while the deepest dredging (SO249-DR33) was made in the Aleutian trench southeast of Adak Island at 6,790 m depth. On average (n = 150), sampling depth was 3,877 m (median: 3,834 m). Correspondingly, biological sampling during SO-249 included bathyal, abyssal, and hadal zones of the Northern Pacific Ocean and the Bering Sea.

7.3.2 Collecting Report: Meiofauna

About 100 kg of sediment were obtained using the four sediment trap tubes placed inside the chain bag dredges. Sediment was recovered in varying quantities from all (100%) of the 150 stations sampled (see Appendix III). These 150 samples were fixed and packed for later extraction of meiofaunal organisms at the Museum für Naturkunde (Berlin, Germany).

7.3.3 Collecting Report: Macrofauna

Macrofaunal organisms were recovered from 112 (74.7%) of the 150 sampled stations (see Appendix III). In total, almost 1,500 single samples were obtained. This material included representatives of several metazoan phyla, incl. Porifera, Cnidaria, Nemertea, Annelida, Echiura, Sipunculida, Arthropoda, Brachiopoda, Mollusca, Bryozoa, Echinodermata, Enteropneusta, Tunicata, and Vertebrata. The largest part of the specimens was fixed in formalin and/or ethanol, with selected material being stored in the three additional fixatives available during the cruise (paraformaldehyde, acetone/methanol, RNAlater). The following descriptions of selected material collected during SO-249 illustrate the large diversity of macrofaunal organisms obtained.

Sponges (Porifera) were collected in relatively large quantities, indicating a high abundance of these organisms in many of the sampled localities. The sponges obtained belong exclusively to the Hexactinellida and Demospongiae. Specimens ranged in length from a few millimeters to several centimeters (Fig. 111A). In addition, specimens >1 m were dredged as well, although these larger samples were brought up in pieces due to the sampling method

used (Fig. 111B). Of particular interest were several specimens of about 30 cm length collected near Attu Island – these animals belong to a group of carnivorous sponges (*Cladorhiza* sp.) that in the Northern Pacific are known to feed on amphipods (Watling 2007).

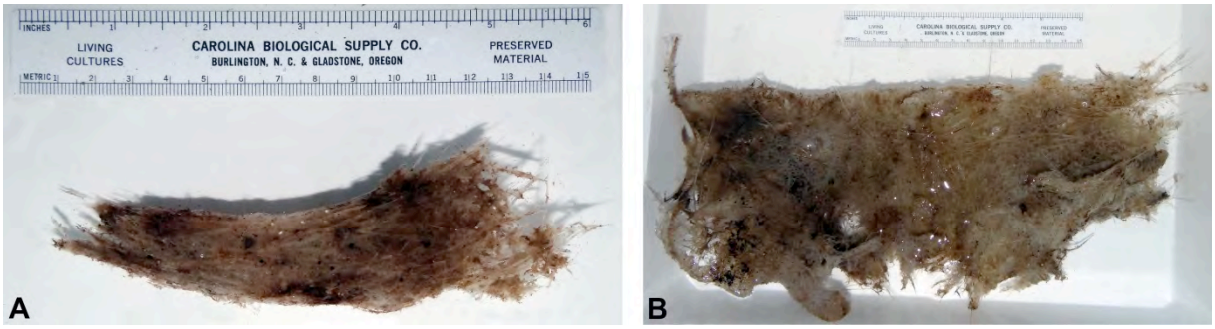


Fig. 111: Selected sponges (Porifera) collected during SO-249. (A) Cone-shaped sponge found near the Krusenstern Fracture Zone at about 5,000 m depth. (B) Large piece of a vase-shaped sponge collected near the Beringia Margin at about 2,200 m depth.

The cnidarians (Cnidaria) collected during SO-249 primarily consisted of jellyfishes and corals. Bubblegum corals (Scleraxonia: Paragorgiidae) were frequently found in the western and northern areas of the Bering Sea (Fig. 112A), while other forms of soft corals (Alcyonacea: Calcaxonia) were more frequently collected south and west of the Aleutian Islands. The jellyfishes obtained included representatives of the benthopelagic deep sea genus *Atolla* (Fig. 112B), but also epipelagic taxa such as the Portuguese man o' war (*Physalia physalis*). This and other epipelagic jellyfish species got entangled in the steel cable of the dredge during uplift. Despite the relatively large number of octocorals collected, none of the samples contained an egg deposited on its coral branches by a dumbo octopus. However, a large number of brittle stars (see below) closely associated with soft corals were found (Fig. 112C).

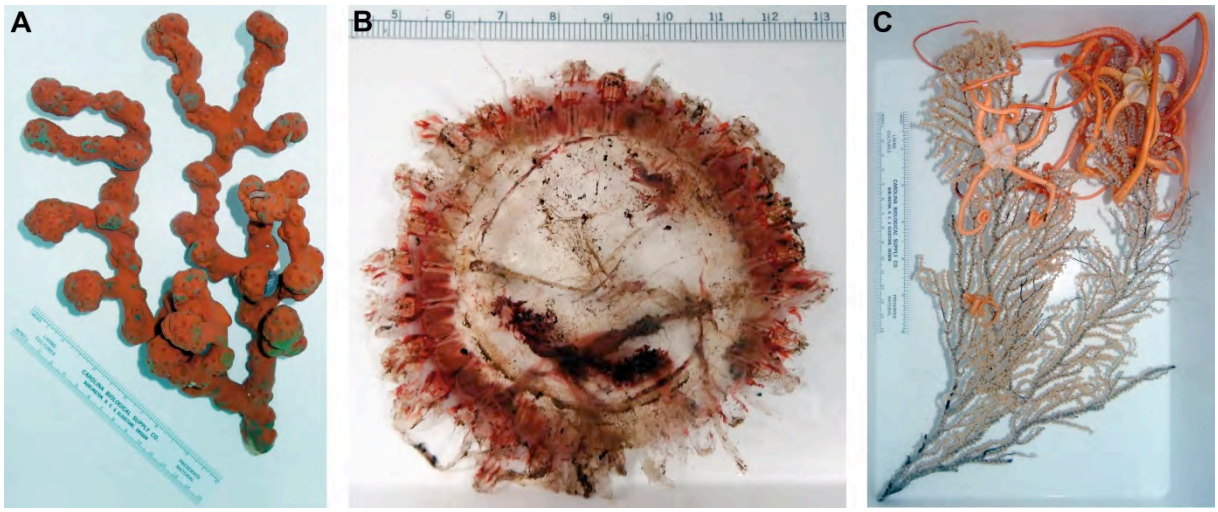


Fig. 112: Selected cnidarians (Cnidaria) collected during SO-249. (A) Bubblegum coral (*Paragorgia* sp.) collected near the Beringia Margin at about 2,000 m depth. (B) Coronate medusa (*Atolla* sp.) found at about 3,200 m depth near Detroit seamount. (C) Chrysogorgiid coral associated with several large brittle stars collected near Tenji seamount at about 2,800 m depth.

The arthropods (Arthropoda) collected included sea spiders (Pycnogonida) and crustaceans (Crustacea). The sea spiders caught during SO-249 were relatively large specimens (>20 cm leg span), a size typical for several deep sea taxa. Crustaceans were represented by isopods (Isopoda), amphipods (Amphipoda), barnacles (Cirripedia), ostracods (Ostracoda), squat lobsters (Anomura: Galatheidae), crabs (Brachyura), and shrimps (Decapoda: Caridea). The largest crustacean specimens sampled were several different species of spider crabs (Brachyura: Majidae). Here, the two most prevalent morphotypes were specimens with relatively long legs and a smooth carapace (Fig. 113A) as well as specimens

with relatively short legs and a thorny carapace (Fig. 113B). Some of the specimens had skeleton shrimps (Amphipoda: Caprellidae) attached to their antennae, while other amphipods were observed attached to the legs of sea spiders.

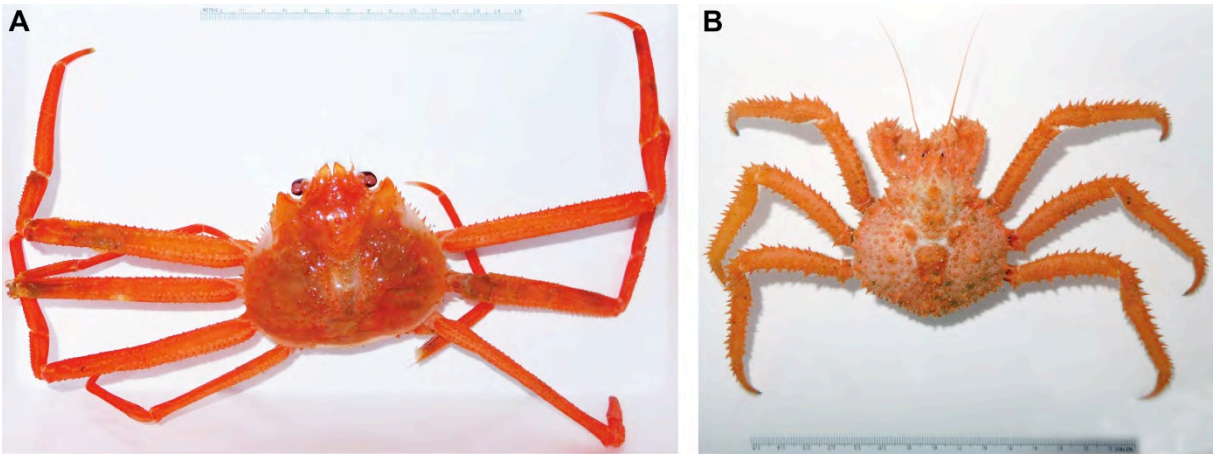


Fig. 113: Selected crustaceans (Arthropoda: Crustacea) collected during SO-249. (A) Spider crab (Majidae) collected near the Beringia Margin at about 2,100 m depth. (B) Spider crab (Majidae) found near Piip volcano at about 2,500 m water depth.

Various lamp shell (Lophotrochozoa: Brachiopoda) species were obtained as well. These included juvenile as well as adult specimens. In total, about a dozen tissue samples were successfully extracted for immunohistochemical, genomic, and transcriptomic analysis.

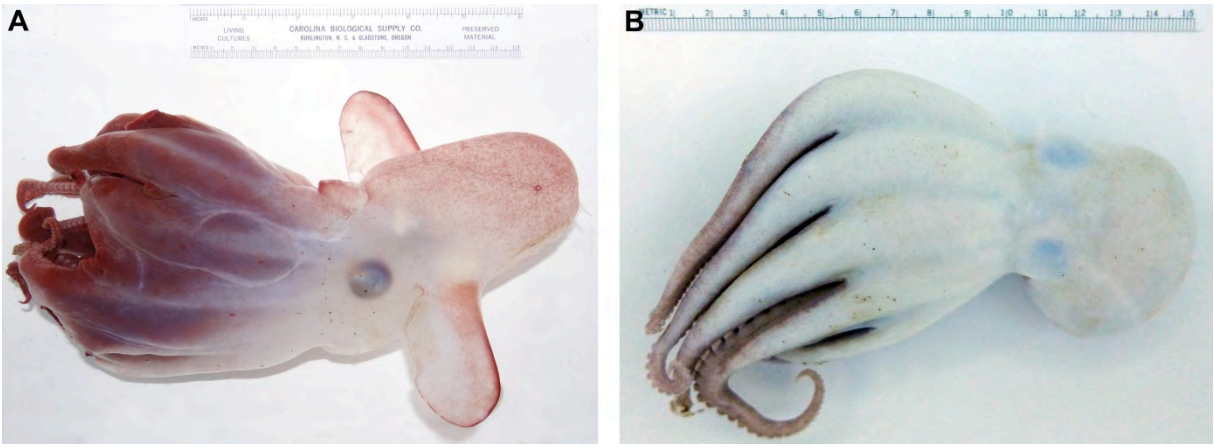


Fig. 114: Cephalopods (Mollusca: Cephalopoda) collected during SO-249. (A) Fully intact adult specimen of a dumbo octopus (Opistoteuthidae: *Grimpoteuthis*) collected near Tenji seamount at about 4,200 m depth. (B) One of the several incirrate octopods (Octopodiformes: Incirrata) collected near the Alpha Fracture Zone at about 2,500 m depth.

The molluskan (Mollusca) macrofauna obtained during SO-249 comprised chitons (Polyplacophora), bivalves (Bivalvia), snails (Gastropoda), and cephalopods (Cephalopoda). Particularly notable among these specimens was a chiton with asymmetrically arranged plates that were shifted to a posterior position as well as several cephalopods. The latter included a single, almost completely intact specimen of a cirrate octopus (Octopodiformes: Cirrata) as well as two dozen eggs and several adults of incirrate octopods (Octopodiformes: Incirrata). A preliminary taxonomic analysis based on morphological characters resulted in the identification of the cirrate octopus (Fig. 114A) as a dumbo octopus (Opistoteuthidae: *Grimpoteuthis*). This finding constitutes the first record of this genus in the entire northwestern and high northern Pacific (Voss and Pearcy 1990, Collins and Villanueva 2006). However, no dumbo octopus eggs were found associated with soft corals (see above). In contrast, the incirrate material included a complete clutch of eggs with embryos in an advanced stage as well as several adult specimens (Fig. 114B). The cephalopod material obtained during SO-249 will be used to

conduct the first description of cephalopod species based in part on non-invasive imaging techniques, in particular magnetic resonance imaging (Ziegler and Mueller 2011, Ziegler and Menze 2013).

The echinoderm (Echinodermata) specimens obtained included sea lilies (Crinoidea), sea stars (Asteroidea), brittle stars (Ophiuroidea), and sea cucumbers (Holothuroidea). No sea urchins (Echinoidea) were collected and the number of crinoids and asteroids was relatively low (see Appendix III), with most of the asteroids being found in the Bering Sea at localities with consolidated sediment. In contrast to crinoids, asteroids, and echinoids, holothuroids were sampled more frequently. The structural and taxonomic diversity of sea cucumbers caught was relatively high and included deep sea representatives of the Deimatidae (Fig. 115A) and the Elpidiidae (Fig. 115C), but also members of the Apodida (Fig. 115B) and the Psolidae (Fig. 115D). The most abundant echinoderm taxon, however, were the ophiuroids. Here, a large number of specimens was collected, usually epibionts of soft corals (see above) or of rocks and boulders. As intended, sufficient tissue from a large number of individuals was conserved for subsequent immunohistochemical, genomic, and transcriptomic analyses.

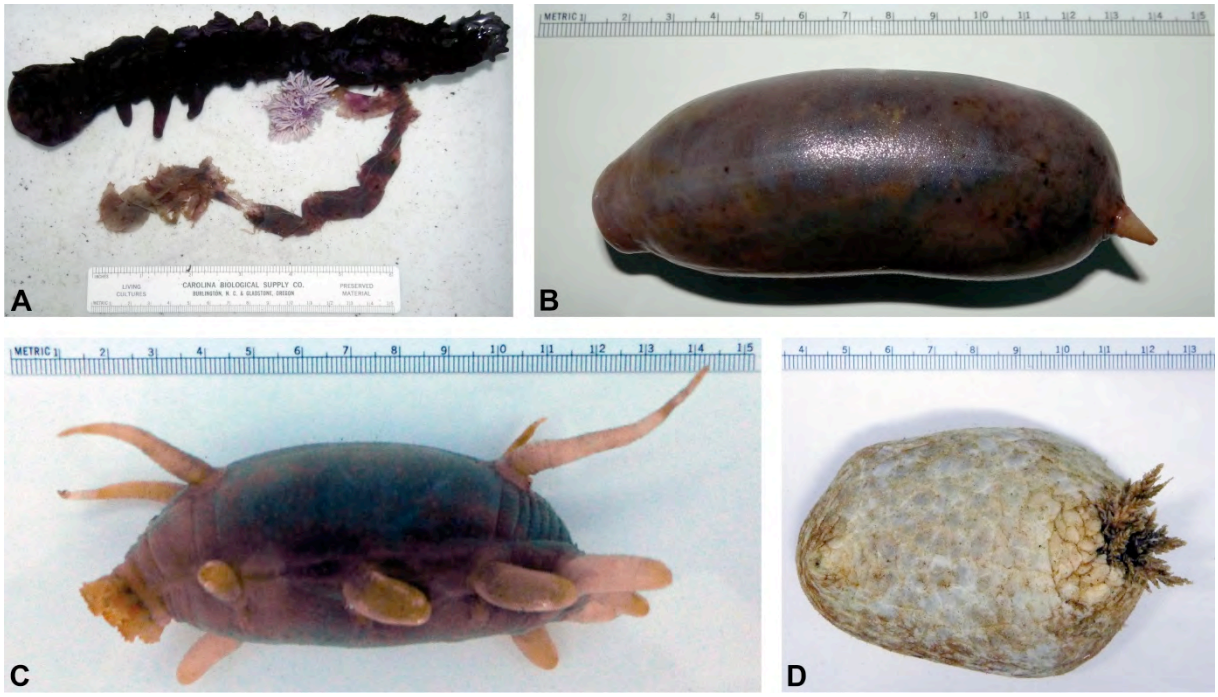


Fig. 115: Sea cucumbers (Echinodermata: Holothuroidea) collected during SO-249. (A) A member of the Deimatidae (Elasipodida) found near the Western Cones at about 3,300 m depth. (B) A representative of the Apodida (Apodacea) collected near Detroit seamount at about 4,100 m depth. (C) A fully intact sea pig (Elpidiidae: *Scotoplanes*) caught near the Alpha Fracture Zone at about 3,100 m depth. (D) A member of the Psolidae (Dendrochirotida) found on Piip Volcano at about 700 m depth.

In addition to the various invertebrate taxa collected during SO-249, a small number of vertebrates were obtained as well. These included two samples of teleost (Osteichthyes: Teleostei) fishes. The first was the palatine bone of a specimen of the North Pacific daggertooth (Alepisauridae: *Anotopterus nikparini*) collected near Adak Canyon at about 4,000 m depth and the second was an almost 1 m large specimen of grenadier fish (Macrouridae: *Coryphaenoides*) collected near the Komandorski block at about 2,600 m depth.

All macrofaunal specimens collected during SO-249 will be transferred to the Museum für Naturkunde (Berlin, Germany), where they will be re-assessed and then distributed to colleagues for species identification.

8. ACKNOWLEDGEMENTS

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Appendix I (SO-249 Rock Sampling Summary)

Type	Stat.	Location	total volume	Rec. DR	Rock summary	on bottom / start lat °N	on bottom / start long °	off bottom / end lat °N	off bottom / end long°	depth (m) begin	depth (m) end	Mag	VC	Sed	Mn
	Leg 1														
CTD	1	East of Amlia Fracture Zone			*for sound profile*	51,001	172,001	51,000	172,000		2500				
DR	2	Amlia Fracture Zone	few rocks	1	volcaniclastic rocks, Mn-crusts and nodules	50,307	186,905	50,300	186,902	5360	4900		yes		yes
DR	3	Amlia Fracture Zone	few rocks	1	lava fragm., volcaniclastic and (meta)sedimentary rocks, Mn	50,292	186,948	50,289	186,936	5700	5200	yes	yes	yes	yes
DR	4	Amlia Fracture Zone	empty	0		50,182	186,830	50,176	186,838	4514	4030				
DR	5	Bendfault west of Amlia Fracture Zone	few rocks	1	lava fragments, intrusive rocks	49,735	184,976	49,728	184,980	5460	4900	yes			
DR	6	Adams Seamount	full	1	pillow fragments, scoria, volcaniclastic and sedimentary rocks	50,032	183,732	50,024	183,732	4000	3492	yes	yes	yes	
DR	7	Aleuten Trench	1/4 full	1	lava fragm., intrusive, metamorphic, and sedimentary rocks	50,786	183,831	50,779	183,827	5000	4560	yes		yes	
DR	8	Adak Canyon	one rock	1	meta sediment	51,233	182,620	51,241	182,622	3720	3403			yes	
DR	9	Adak Canyon	full	1	lava fragments, volcaniclastic rocks	51,340	182,866	51,346	182,878	3500	2900	yes	yes		
DR	10	Adak Canyon	1/4 full	1	lava fragments, sedimentary rocks	51,250	182,650	51,254	182,645	3700	3400	yes		yes	
DR	11	Adak Canyon	one rock	1	lava fragment	50,575	181,755	50,583	181,753	4812	4400	yes			
DR	12	Southern extension of Adak Canyon	1/2 full	1	sedimentary rocks, metasediments	50,709	182,029	50,714	182,020	4450	3950			yes	
DR	13	Amatignak Canyon	few rocks	1	lava fragment, solidified sediments	50,979	180,346	50,983	180,333	5426	5078	yes		yes	
DR	14	Amatignak Canyon	few rocks	1	volcaniclastic rocks, sedimentary rocks	51,011	180,556	51,004	180,556	5130	4680		yes	yes	
DR	15	Amatignak Canyon	1/4 full	1	lava fragments, metamorphic and sedimentary rocks	50,954	180,542	50,948	180,550	4900	4384	yes		yes	
DR	16	Amatignak Canyon	1/4 full	1	lava f., volcaniclastic, sedimentary and intrusive (?) rocks	50,881	180,414	50,875	180,418	5523	4991				
DR	17	1. Seamount east of Rat Fracture Zone	empty	0		49,510	179,373	49,515	179,381	4669	4309				
DR	18	2. Seamount east of Rat Fracture Zone	few rocks	1	intrusive, volcaniclastic, and sedimentary rocks	49,541	178,500	49,547	178,507	4312	3893	yes	yes	yes	
DR	19	3. Seamount east of Rat Fracture Zone	empty	0		49,480	178,526	49,472	178,526	4802	4479				
DR	20	Rat Fracture Zone	only Mn	0	magnese crusts and nodules	48,977	177,788	48,973	177,790	5265	5057				yes
DR	21	Rat Fracture Zone	few rocks	1	lava fragm., intrusive, voclaniclastic, and sedimentary rocks	49,014	177,987	49,011	177,989	5195	4946	yes	yes	yes	
DR	22	Rat Fracture Zone	few rocks	1	lava fragments	48,717	178,103	48,711	178,101	5659	5141	yes			
DR	23	Rat Fracture Zone	few rocks	1	volcaniclastic rocks, Mn-crusts	48,738	177,504	48,731	177,502	5088	4510		yes		yes
DR	24	Rat Fracture Zone	1/6 full	1	lava fragments, intrusive and voclaniclastic rocks	49,954	177,669	49,946	177,671	5419	5130	yes	yes		
DR	25	Murray Canyon	1/4 full	1	lava fragments, intrusive and sedimentary rocks	51,691	176,757	51,685	176,753	3540	3171	yes		yes	
DR	26	Murray Canyon	1/4 full	1	lava fragments, (meta)sedimentary rocks	51,511	176,111	51,518	176,108	4445	4067	yes		yes	
DR	27	Murray Canyon	few rocks	1	lava fragments	51,628	176,409	51,635	176,406	4089	3683	yes			
DR	28	Murray Canyon	few rocks	1	lava fragments	51,693	176,781	51,686	176,782	3557	2978	yes			
DR	29	Murray Canyon	full	1	lava fragm., intrusive, voclaniclastic, and sedimentary rocks	51,688	176,788	51,681	176,792	2894	2377	yes	yes	yes	
DR	30	Murray Canyon	1/4 full	1	lava fragments, intrusive and sedimentary rocks	51,679	176,799	51,673	176,802	2194	1825	yes		yes	
DR	31	Murray Canyon	few rocks	1	lava fragments, solidifed sediments	51,619	176,555	51,613	176,559	4280	3563	yes		yes	
DR	32	Murray Canyon	1/6 full	1	lava fragments, solidifed sediments	51,508	176,058	51,515	176,057	4197	3816	yes		yes	
DR	33	Aleutian trench	1/4 full	0	semi-consolidated sediments (mud)	51,073	175,540	51,081	175,532	6790	6505				
DR	34	Aleutian trench	1/4 full	1	sedimentary rocks	51,281	174,825	51,287	174,819	6079	5703			yes	
DR	35	Western Cones	1/3 full	1	lava fragments, intrusive and sedimentary rocks	53,403	172,199	53,396	172,197	3549	3351	yes		yes	
DR	36	Western Cones	empty	0		53,411	172,077	53,407	172,155	3694	3557				

Appendix I (SO-249 Rock Sampling Summary)

Type	Stat.	Location	total volume	Rec. DR	Rock summary	on bottom / start lat °N	long °	off bottom / end lat °N	long°	depth (m) begin	end	Mag	VC	Sed	Mn
DR	37	Western Cones	1/5 full	1	lava fragments	53,430	172,072	53,425	172,070	3643	3340	yes			
DR	38	Western Cones	full	1	lava f., intrusive (dropstones?) and (meta)sedimentary rocks	53,486	171,993	53,498	171,981	3554	3042	yes		yes	
DR	39	Kresta Ridge	1/4 full	1	lava fragments, intrusive and sedimentary rocks	53,271	171,595	53,278	171,597	3342	2903	yes		yes	
DR	40	Kresta Ridge	1/4 full	1	lava fragments, intrusive rocks	53,380	171,218	53,387	171,221	3570	3054	yes			
DR	41	Kresta Ridge	1/2 full	1	lava fragm., volcaniclastic and (meta)sedimentary rocks	53,405	171,172	53,412	171,173	3311	2815	yes	yes	yes	
DR	42	Aleutian Trench	2/3 full	1	lava fragm., volcaniclastic and (meta)sedimentary rocks	52,661	170,400	52,669	170,402	6115	5628	yes	yes	yes	
DR	43	Aleutian Trench	1/6 full	1	lava fragment, sedimentary rocks, solidified sediments	52,778	170,336	52,785	170,335	5668	5377	yes		yes	
DR	44	Aleutian Trench	1/5 full	1	sedimentary rocks	52,830	169,956	52,838	169,954	6670	6209			yes	
DR	45	Stalemate Fracture Zone (northern section)	1/2 full	1	lava fragm., intrusive, voclaniclastic, and sed. rocks, Mn	52,661	169,692	52,656	169,680	5263	4705	yes	yes	yes	yes
DR	46	Stalemate Fracture Zone (northern section)	empty	0	*(dredge stucked at start point of the dredge track)*	52,705	169,716	52,701	169,716	6441	6432				
DR	47	Stalemate Fracture Zone (northern section)	1/4 full	1	lava fragments, intrusive and sedimentary rocks	52,483	169,661	52,481	169,649	3429	3050	yes		yes	
DR	48	Attu Canyons	1/4 full	1	lava fragments, sedimentary rocks, solidified sediments	52,605	171,400	52,605	171,386	3815	3493	yes		yes	
DR	49	Attu Canyons	1/2 full	1	lava fragm., volcaniclastic and sed. rocks, solidified sed.	52,282	172,276	52,289	172,269	3716	3307	yes	yes	yes	
DR	50	Attu Canyons	1/4 full	1	sedimentary rocks, semi-consolidated sediments (mud)	52,333	172,376	52,328	172,373	3713	3317			yes	
DR	51	Slope southwest of Agattu	1/4 full	1	lava fragments, volcaniclastic and sedimentary rocks	52,260	172,970	52,265	172,977	1512	1099	yes	yes	yes	
PR	52	Stalemate Fracture Zone			*Profiling along Stalemate FZ (170°45,00´E - 173°31,45´E)*										
DR	53	Stalemate Fracture Zone	few rocks	1	lava fragments, sedimentary rocks	50,079	173,422	50,077	173,431	4095	3708	yes		yes	
DR	54	Stalemate Fracture Zone	1/2 full	1	lava fragments, subvolcanic and sedimentary rocks	50,056	173,507	50,050	173,498	3684	3202	yes		yes	
DR	55	Stalemate Fracture Zone	1/6 full	1	lava fragments, sedimentary rocks	50,469	173,034	50,463	173,031	4166	3744	yes		yes	
DR	56	Stalemate Fracture Zone	few rocks	1	lava fragments, sedimentary rocks	50,574	172,893	50,567	172,890	4147	3656	yes		yes	
DR	57	Stalemate Fracture Zone	1/3 full	1	lava fragments, intrusive and sedimentary rocks, Mn-crusts	50,657	172,744	50,649	172,740	4054	3657	yes		yes	yes
DR	58	Stalemate Fracture Zone	1/2 full	1	subvolcanic, intrusive, and sedimentary rocks	50,887	172,265	50,878	172,266	4453	3930	yes		yes	
DR	59	Stalemate Fracture Zone	1/3 full	1	lava fragments, sedimentary rocks, Mn-crusts	51,024	172,022	51,018	172,017	4274	3814	yes		yes	yes
DR	60	Stalemate Fracture Zone	few rocks	1	subvolcanic rocks	51,463	171,221	51,456	171,217	3836	3230	yes			
DR	61	Stalemate Fracture Zone	1/2 full	1	lava fragments, intrusive and volcaniclastic rocks, Mn-crusts	51,393	171,273	51,386	171,268	3071	2508	yes	yes		yes
DR	62	Emperor Seamount Province	1/5 full	1	lava fragments, volcaniclastic rocks	51,303	170,344	51,299	170,335	4447	3880	yes	yes		
DR	63	Emperor Seamount Province	1/8 full	1	lava fragments, subvolcanic and sedimentary rocks, Mn	51,158	169,857	51,150	169,852	4441	3947	yes		yes	yes
DR	64	Emperor Seamount Province	few rocks	1	lava fragments, sedimentary rocks	51,065	168,799	51,058	168,796	2945	2446	yes		yes	
DR	65	Emperor Seamount Chain, S of Detroit	1/8 full	1	lava fragment, dropstones, Mn-crusts	50,533	167,483	50,540	167,475	2897	2917	yes			yes
DR	66	Emperor Seamount Chain, Detroit	1/2 full	1	lava fragments, sedimentary rocks	50,652	167,366	50,643	167,361	2252	1917	yes		yes	
DR	67	Emperor Seamount Chain, Detroit	few rocks	0	solidified sediments, dropstones	50,564	167,072	50,568	167,083	4308	3876				
DR	68	Emperor Seamount Chain, Hanzei	few rocks	1	lava fragments, volcaniclastic rocks	49,990	167,361	49,998	167,356	4204	3641	yes	yes		
DR	69	Emperor Seamount Chain, Hanzei	few rocks	1	lava fragments, sedimentary rocks, dropstones	50,028	167,212	50,019	167,217	3403	3004	yes		yes	
DR	70	Emperor Seamount Chain, Hanzei	1/4 full	1	lava fragments, sedimentary rocks, Mn-crusts, dropstones	50,017	167,509	50,026	167,507	3685	3278	yes		yes	yes
DR	71	Emperor Seamount Chain, Suizei	1/2 full	1	lava fragment, dropstones	49,810	167,797	49,801	167,797	2960	2469	yes			
DR	72	Emperor Seamount Chain, Suizei	empty	0		49,738	167,856	49,743	167,853	2639	2331				
DR	73	Emperor Seamount Chain, Suizei	few rocks	0	dropstones	49,574	167,813	49,583	167,813	3230	2764				

Appendix I (SO-249 Rock Sampling Summary)

Type	Stat.	Location	total volume	Rec. DR	Rock summary	on bottom / start lat °N	long °	off bottom / end lat °N	long°	depth (m) begin	end	Mag	VC	Sed	Mn
DR	74	Emperor Seamount Chain, Suizei	1/4 full	1	volcaniclastic rock, Mn-crusts, dropstones	49,625	168,557	49,624	168,543	3871	3881		yes		yes
DR	75	Emperor Seamount Chain, Suizei	few rocks	1	lava fragments, solidified sediments, dropstones	49,732	168,566	49,737	168,557	3378	2960	yes			
DR	76	Emperor Seamount Province	1/6 full	1	lava fragments, dropstones	50,282	169,938	50,274	169,939	3341	2922	yes			
DR	77	Emperor Seamount Province	few rocks	1	lava fragment, dropstones	50,096	169,929	50,103	169,929	4136	3680	yes			
DR	78	Emperor Seamount Province	1/6 full	1	lava fragment, Mn-crusts, dropstones	50,006	170,200	50,014	170,200	3130	2615	yes			yes
DR	79	Emperor Seamount Chain, Tenji	empty	0		49,382	169,853	49,389	169,851	4504	4059				
DR	80	Emperor Seamount Chain, Tenji	few rocks	1	lava fragments, dropstones	49,297	169,717	49,303	169,713	4701	4174	yes			
DR	81	Emperor Seamount Chain, Tenji	few rocks	1	lava fragment, Mn-crusts, dropstones, corals	48,739	169,253	48,732	169,243	3139	2614	yes			yes
DR	82	Emperor Seamount Chain, Tenji	empty	0	squid	48,459	168,870	48,465	168,878	4417	3913				
DR	83	Emperor Seamount Chain, Tenji	one rock	0	dropstone	48,414	167,903	48,413	167,909	4923	4432				
DR	84	Emperor Seamount Chain, Tenji	few rocks	0	sediments, Mn-crusts and nodules	48,917	168,049	48,917	168,061	3903	3499				yes
DR	85	Krusenstern Fracture Zone	two rocks	0	dropstones	48,535	167,161	48,541	167,169	6042	5560				
DR	86	Krusenstern Fracture Zone	empty	0		49,295	166,336	49,302	166,342	5905	5365				
CTD	87	Krusenstern Fracture Zone			*for sound profile*	49,302	166,342	49,302	166,342						
DR	88	Krusenstern Fracture Zone	1/4 full	1	lava fragments, volcaniclastic rocks	49,413	166,272	49,408	166,268	5189	4668	yes	yes		
DR	89	Krusenstern Fracture Zone	few rocks	1	lava fragments, (meta)sedimentary rocks	50,303	165,640	50,298	165,633	5012	4565	yes		yes	
DR	90	Krusenstern Fracture Zone	few rocks	1	lava fragments, volcaniclastic rocks	50,339	165,644	50,333	165,638	5256	4703	yes		yes	
DR	91	Ocean crust SW of Krusenstern FZ	few rocks	1	lava fragments, subvolcanic and sedimentary rocks, Mn	49,909	163,588	49,901	163,585	5743	5362	yes	yes	yes	yes
DR	92	"Gummi Bear" Seamount	1/4 full	1	lava fragments, volcaniclastic rocks, Mn-crusts	50,067	163,035	50,062	163,030	5043	4674	yes	yes		yes
DR	93	"Gummi Bear" Seamount	1/4 full	1	lava fragments, volcaniclastic rocks	49,947	163,079	49,941	163,071	5251	4830	yes	yes		
DR	94	Basin between Krusenstern and NN FZ	3 rocks	1	lava fragments	49,361	163,349	49,355	163,342	5245	4707	yes			
DR	95	Basin between Krusenstern and NN FZ	few rocks	0	dropstones, Mn-nodules	49,385	163,226	49,379	163,224	5720	5138				yes
DR	96	Basin between Krusenstern and NN FZ	few rocks	1	lava fragments, metamorphic rocks (dropstones)	49,509	163,137	49,504	163,136	5758	5420	yes			
DR	97	Basin between Krusenstern and NN FZ	2 rocks	1	lava fragment (dropstone?)	49,394	163,166	49,388	163,167	5008	4425	yes			
DR	98	Basin between Krusenstern and NN FZ	empty	0		49,322	163,245	49,329	163,245	5616	5190				
DR	99	Basin between Krusenstern and NN FZ	empty	0		49,628	163,032	49,634	163,037	5909	5523				
DR	100	NN FZ	empty	0		48,844	162,780	48,841	162,788	5639	5299				
DR	101	NN FZ	empty	0		49,107	162,809	49,113	162,815	5737	5380				
	Leg 2														
CTD	102	Komandorsky Block			*for sound profile*	54,519	165,532	54,519	165,532		2500				
DR	103	Komandorsky Block	1/6 full	1	sedimentary rocks	54,615	165,871	54,622	165,872	5126	4704			yes	
DR	104	Komandorsky Block	few rocks	1	sedimentary rocks	54,699	165,821	54,692	165,815	5383	5014			yes	
CTD	105	Beringia Margin			*for sound profile*	60,000	179,499	60,000	179,500		2500				
DR	106	Beringia Margin	full	0	semi-consolidated sediment, biology	60,333	179,565	60,328	179,568	2496	2109				
DR	107	Beringia Margin	1/5 full	0	semi-consolidated sediment, biology	60,483	179,427	60,489	179,429	2316	2003				
DR	108	Beringia Margin	1/4 full	0	semi-consolidated sediment, biology	60,598	179,082	60,603	179,081	2192	1729				
DR	109	Chukotka Margin	few rocks	1	sedimentary rock (conglomerate), biology	60,148	171,481	60,153	171,487	2720	2099			yes	

Appendix I (SO-249 Rock Sampling Summary)

Type	Stat.	Location	total volume	Rec. DR	Rock summary	on bottom / start lat °N	on bottom / start long °	off bottom / end lat °N	off bottom / end long°	depth (m) begin	depth (m) end	Mag	VC	Sed	Mn
DR	110	Chukotka Margin	1/2 full	0	semi-consolidated sediment, biology	60,052	171,296	60,051	171,308	2411	1941				
DR	111	Chukotka Margin	1/2 full	0	semi-consolidated sediment, biology	59,678	170,726	59,671	170,727	1721	1195				
DR	112	Shirshov Ridge	1/2 full	1	metamorphic rocks	58,785	170,004	58,785	169,906	1909	1447	yes			
DR	113	Shirshov Ridge	1/4 full	0	semi-consolidated sediment	58,361	169,717	58,367	169,729	2721	2291				
DR	114	Shirshov Ridge	full	1	metamorphic rocks	58,256	169,652	58,249	169,645	2739	2262	yes			
DR	115	Shirshov Ridge	few rocks	0	unconsolidated sediment, dropstones	57,689	169,149	57,683	169,149	2921	2557				
CTD	116	Beta Rise			*for sound profile*	57,907	165,960	57,907	165,960		2000				
DR	117	Beta Rise	1/6 full	1	sedimentary rocks	57,543	164,358	57,537	164,360	2984	2763			yes	
DR	118	Beta Rise	few rocks	0	semi-consolidated sediments (mud), dropstones	56,674	166,106	56,667	166,101	3591	3273				
DR	119	Beta Rise	1/4 full	1	lava fragments, semi-consolidated sediment, dropstones	57,041	165,682	57,046	165,671	3457	3189	yes			
DR	120	Alpha FZ	2/3 full	0	Mn-nodules, semi-consolidated sediment, dropstones	57,193	164,071	57,185	164,068	2713	2367				
DR	121	Alpha FZ	1/8 full	0	unconsolidated sediment, biology	57,070	164,039	57,077	164,042	3264	2997				
DR	122	Alpha FZ	1/4 full	0	semi-consolidated sediment, wood	57,081	164,321	57,087	164,324	2750	2438				
DR	123	Alpha FZ	few rocks	1	lava or tuff (probably in situ), dropstones	56,035	166,574	56,044	166,577	3698	3287				
DR	124	Volcanologists Massif	1/4 full	1	lava fragments, dropstones	55,697	167,127	55,689	167,117	3879	3460	yes			
DR	125	Alpha FZ	few rocks	1	volcaniclastic rocks, sedimentary rocks, dropstones	55,798	167,359	55,806	167,361	4215	3668		yes	yes	
DR	126	Volcanologists Massif	3/4 full	1	lava fragments	55,457	167,504	55,450	167,508	2954	2384	yes			
DR	127	Volcanologists Massif	1/2 full	1	lava fragments, volcaniclastic rocks	55,337	167,474	55,343	167,472	2548	2158	yes	yes		
DR	128	Piip Volcano	full	1	lava fragments	55,422	167,273	55,418	167,274	670	460	yes			
DR	129	Piip Volcano	full	1	volcaniclastic rocks, unconsilidated sediments	55,395	167,272	55,400	167,269	878	642		yes		
DR	130	Piip Volcano	full	1	volcaniclastic rocks	55,395	167,236	55,399	167,239	1145	904		yes		
DR	131	Piip Volcano	full	1	lava fragments, volcaniclastic rocks	55,384	167,271	55,382	167,266	712	537	yes	yes		
DR	132	Volcanologists Massif	1/5 full	1	lava fragments, volcaniclastic rocks	55,284	167,301	55,290	167,300	3036	2607	yes	yes		
DR	133	Volcanologists Massif	full	1	lava fragments, volcaniclastic rocks	55,253	167,335	55,258	167,347	3792	3271	yes	yes		
DR	134	Komandorsky Block	1/2 full	1	lava fragments, volcaniclastic and sedimentary rocks	54,348	168,685	54,343	168,682	1645	1220	yes	yes	yes	
DR	135	Guyot southeast of Medny Island	full	1	lava fragments	54,283	168,746	54,276	168,743	898	344	yes			
DR	136	Komandorsky Block	1/4 full	1	sedimentary rocks	54,345	166,796	54,354	166,795	3866	3350			yes	
DR	137	Komandorsky Block	few rocks	1	sedimentary rocks	54,135	167,100	54,138	167,105	3958	3591			yes	
DR	138	Komandorsky Block	1/3 full	1	lava fragments, subvolcanic and sedimentary rocks	54,375	167,061	54,379	167,069	1390	1052	yes		yes	
DR	139	Komandorsky Block	full	1	lava fragments, volcaniclastic and sedimentary rocks	54,427	167,150	54,435	167,146	920	424	yes	yes	yes	
DR	140	Bathymetric Highs SE of Volcanologists M.	few rocks	1	lava fragment (in situ?), crust, dropstones	55,219	161,036	55,215	168,042	3719	3508	yes		yes	
DR	141	Bathymetric Highs SE of Volcanologists M.	few rocks	0	semi-consolidated sediments (mud), dropstones	55,255	167,733	55,261	167,734	3832	3597				
DR	142	Volcanologists Massif	2 rocks	1	lava fragment	55,528	167,452	55,531	167,459	3737	3565	yes			
DR	143	Volcanologists Massif	empty	0		55,464	167,417	55,468	167,413	3271	3116				
DR	144	Volcanologists Massif	full	1	lava fragments	55,438	167,334	55,442	167,333	2360	2020	yes			
DR	145	Volcanologists Massif	empty	0		55,321	167,340	55,327	167,338	2589	2251				
DR	146	Volcanologists Massif	few rocks	1	lava fragments	55,250	167,257	55,258	167,255	3934	3454	yes			

Appendix I (SO-249 Rock Sampling Summary)

Type	Stat.	Location	total volume	Rec. DR	Rock summary	on bottom / start lat °N	long °	off bottom / end lat °N	long°	depth (m) begin	end	Mag	VC	Sed	Mn
DR	147	Komandorsky Block	1/3 full	1	intrusive and metamorphic rocks	55,225	167,166	55,218	167,166	2940	2476	yes			
DR	148	Komandorsky Block	1/3 full	1	intrusive and volcaniclastic rocks	55,269	167,065	55,261	167,065	3508	3091	yes		yes	
DR	149	Komandorsky Block	1/8 full	1	sedimentary and volcaniclastic rocks	56,012	165,023	56,018	165,026	4672	4176		yes	yes	
DR	150	Komandorsky Block	1/2 full	1	sedimentary rocks	55,937	165,066	55,930	165,061	4447	4030			yes	
DR	151	Komandorsky Block	few rocks	0	unconsolidated sediment, dropstones	55,827	165,446	55,819	165,435	3520	3170				
DR	152	Komandorsky Block	1/3 full	1	lava frag., metamorphic, volcaniclastic + sedimentary rocks	55,646	165,701	55,640	165,700	3386	2947	yes	yes	yes	
DR	153	Komandorsky Block	3/4 full	1	lava fragments, sedimentary rocks, Mn-crusts	55,639	165,012	55,633	165,023	2160	1630	yes		yes	yes
DR	154	Komandorsky Block	empty	0		55,348	165,012	55,355	165,016	4715	4289				
DR	155	Komandorsky Block	1/4 full	1	lava fragments, volcaniclastic rocks	55,519	164,888	55,521	164,889	1939	1805	yes		yes	
DR	156	Komandorsky Block	1/2 full	1	lava fragments, volcaniclastic rocks	55,519	164,854	55,526	164,856	2912	2423	yes		yes	
				113	**dredges yielded magmatic and / or sed. rocks (75.3%)**							**91**	**34**	**64**	**19**
Dredge Stations (DR): 150				**37**	**dredges returned empty or yielded only soft sediment**			**average depth:**		**3898**					
CTD Stations (CTD): 5					**and / or Mn and / or dropstones (24.7%)**			**max. depth:**		**6790**					
								min. depth:		**670**					

Mag: magmatic rocks
VC: volcaniclastic rocks
Sed: sedimentary rocks
Mn: Mn-crusts, - nodules

Appendix 2 (Leg1 Station Details and Rock Description)

Description of Location and Structure: Amila Fracture Zone. Northern tip at lower base of N-S striking ridge at the western margin of the FZ

Dredge on bottom UTC 08/06/16 12:26hrs, lat 50°18.40'N, long 173° 5.69'W, depth 5360 m
Dredge off bottom UTC 08/06/16 13:47hrs, lat 50°17.99'N, long 173° 5.88'W, depth 4900 m
total volume: One large block and a few smaller rocks
Comments: Some sediments in sediment traps. Mn crusts, semiconsolidated sediments.
Priority: sample 1C, small fresh fragment of basalt from breccia.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR2-1A	1. Rock Type: sediment breccia covered with Fe-Mn crust 2. Size: initial size 40x25x15cm 4. Color of cut surface: greyish brown 9. Encrustations: Fe-Mn crust								no picture taken
SO249-DR2-1B	1. Rock Type: Fe-Mn crust from block A								
SO249-DR2-1C	1. Rock Type: volcanic rock, a diabase clast from sediment breccia (sample 1A) 2. Size: ~ 1x1x1 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, no vesicles, fine grained 8. Secondary Minerals: chlorite could be present 10. Comment: fairly fresh (sub) volcanic rock - diabase. Small, but good for chemistry and dating			1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR2-1D	1. Rock Type: clasts of solid rocks from sediments 2. Size: < 1 cm								
SO249-DR2-2	1. Rock Type: Fe-Mn crust 2. Size: 15x10x5 cm								
SO249-DR2-3	1. Rock Type: Fe-Mn nodule 2. Size: 8x6x6 cm								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR2-4	1. Rock Type: Fe-Mn nodule 2. Size: 10x8x5 cm								
SO249-DR2-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR3

Description of Location and Structure: Amila Fracture Zone. Northern tip at lower base of N-S striking Ridge at the western margin of the FZ

Dredge on bottom UTC 08/06/16 17:56hrs, lat 50°17.53'N, long 173°3.14'W, depth 5700 m

Dredge off bottom UTC 08/06/16 19:26hrs, lat 50°17.31'N, long 173°3.85'W, depth 5200 m

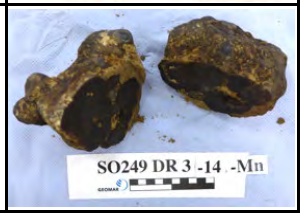
total volume: few rocks

Comments: Three large (>30 cm) blocks and some smaller fragments. Sediment in traps. Some basalt, dolerite, mostly sandstones, tuff. Priority: samples -1, -2 and 4.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR3-1	1. Rock Type: moderately altered volcanic rock 2. Size: 22x22x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark gray 5. Texture / Vesicularity: massive 6. Phenocrysts: Ol, Plg (≤ 2 mm), Px? Plg~ 10%, Ol or Px ~5%, Plg and Px (augite) are fresh. 7. Matrix: fine grained 8. Secondary Minerals: Chl and Fe oxide replacing Ol (if present) 9. Encrustations: thin outer crust of Fe-Mn oxide. 10. Comment: this rock is maybe an altered basalt.	2x	x	~2 Plg			MSC_SK	TS+GC by Airfreight	
SO249-DR3-2	1. Rock Type: moderately altered volcanic rock 2. Size: 10x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg, CPx ~5% up to 3 mm long appear to be fresh 7. Matrix: fine to medium grained 8. Secondary Minerals: chlorite in groundmass? 9. Encrustations: very thin Fe-Mn film on surface 10. Comment: the rock is likely a Px bearing basalt	2x	x	?			MSC_SK	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR3-3	1. Rock Type: metasedimentary rock (tuff?) 2. Size: 12x9x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, no vesicles, medium grained, partly fine grained 6. Phenocrysts: chlorite, Plg, Px?, Qtz?, Bt? 9. Encrustations: very thin Fe-Mn film on surface	2x	x						
SO249-DR3-4	1. Rock Type: intrusive (?) rock, slightly (?) altered 2. Size: 10x5x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg up to 5mm, ~ 10% 7. Matrix: medium grained matrix with some Chl 9. Encrustations: thin film on surface	2x	x	2					
SO249-DR3-5	1. Rock Type: volcanic rock 2. Size: 15x13x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, banded 5. Texture / Vesicularity: thin layered, fine grained 6. Phenocrysts: Plg micro-phenocrysts 9. Encrustations: Fe-Mn crust upto 1 cm 10. Comment: thin veins filled with Fe-Mn oxides. This rock is probably a basalt	2x	x						
SO249-DR3-6	1. Rock Type: intrusive, gabbro (?), altered, deformed 2. Size: 20x15x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark green 5. Texture / Vesicularity: foliated, pegmatitic, crystals up to 1 cm, flat 9. Encrustations: thin Fe-Mn crust 10. Comment: possibly a sheared gabbro (?)	2x	x						
SO249-DR3-7	1. Rock Type: metasedimentary rock (?) 2. Size: 15x17x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine grained with veins, no vesicules 6. Phenocrysts: none 7. Matrix: fine grained 8. Secondary Minerals: thin veins filled with Fe-Mn oxides 9. Encrustations: very thin Fe-Mn crust 10. Comment: meta-claystone?	x							
SO249-DR3-8	1. Rock Type: metasedimentary rock (?), tuff (?) 2. Size: 7x9x2 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: none 7. Matrix: few OPx (?) up to 2 mm long, fine grained 9. Encrustations: thin outer film	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR3-9	1. Rock Type: metavolcanic (?) rock 2. Size: 8x8x2 cm 3. Shape / Angularity: angular 4. Color of cut surface: light green 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg 7. Matrix: aphyric matrix 8. Secondary Minerals: Epidote, Chl, sphene 9. Encrustations: thin film of Fe-Mn on surface	2x							
SO249-DR3-10	1. Rock Type: metavolcanic rock (?) similar to DR9, less Plg phenocrysts 2. Size: 8x3x3 cm	2x							
SO249-DR3-11	1. Rock Type: consolidated sediment (sandstone) 2. Size: 10x6x4 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, medium grained (< 1mm) 6. Phenocrysts: Qtz, Plg, Px, Kfs (?) 9. Encrustations: thin (< 1mm) Fe-Mn crust								
SO249-DR3-12	1. Rock Type: semi-consolidated sandstone, clay matrix 2. Size: 22x10x8 cm (part of block 3; 32x19x11 cm) 4. Color of cut surface: brownish 6. Phenocrysts: many small clasts, predominantly 2-3 mm								
SO249-DR3-13	1. Rock Type: semiconsolidated sedimentary rock (one rock) with large clast of fine grained basalt (?) 2. Size: 11x9x6 cm, basaltic clast is about 3 cm in diameter 3. Shape / Angularity: angular 5. Texture / Vesicularity: fine grained, massive 10. Comment: moderatley altered								
SO249-DR3-14	1. Rock Type: Fe-Mn nodule in semi-consolidated clay 2. Size: 16x11x10 cm 3. Shape / Angularity: rounded 4. Color of cut surface: black-brown 5. Texture / Vesicularity: massive, partly porous 9. Encrustations: Fe-Mn crust 2 cm								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR3-15	1. Rock Type: Fe-Mn nodule in semi-consolidated clay 2. Size: 25x17x8 cm, a part of 30x24x9 cm bloc 9. Encrustations: Fe-Mn crust 9 cm (fragment of thick Fe-Mn crust 10. Comment: similar to DR14								
SO249-DR3-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR4

Description of Location and Structure: Amila Fracture Zone. Northern tip at lower base of N-S striking Ridge at the western margin of the FZ

Dredge on bottom UTC 08/06/16 23:46hrs, lat 50°10.91'N, long 173°10.23'W, depth 4515 m

Dredge off bottom UTC 08/06/16 01:10hrs, lat 50°10.57'N, long 173°9.70'W, depth 4030 m

total volume: empty

Comments:

SO249-DR4-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR5

Description of Location and Structure: Bend fault between Adam Seamount and Amila FZ. NE slope of ridge between bend fault basins, ridge is occupied by small circular structures that may be volcanic cones?

Dredge on bottom UTC 09/06/16 11:39hrs, lat 49°44.12'N, long 175°1.44'W, depth 5460 m

Dredge off bottom UTC 09/06/16 13:00hrs, lat 4943.67'N, long 175°1.22'W, depth 4900 m

total volume: Few rocks

Comments: Angular rock fragments, slope talus with slight Mn coatings. Lava frgments with Ol and Plg phenocrysts

Priority: 1, 2, 3, 4, 7, all maybe good for chemistry, Ar-Ar. Fresh Ol in -7; TS inspection prior to processing!

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR5-1	1. Rock Type: volcanic relatively fresh 2. Size: 22x18x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish, brownish outer part (approx. 1 cm) 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Plg, 7-10%, up to 0.5 cm, relatively fresh. 7. Matrix: fine grained 9. Encrustations: thin Mn coating 10. Comment: largest sample of DR5, may be best for Ar-Ar dating.	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE

SO249-DR-5-2	1. Rock Type: volcanic, relatively fresh 2. Size: 11x9x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: fine grained 6. Phenocrysts: Plg, 7-10%, up to 1 mm, fresh. <1% altered Ol, up to 1 mm. 7. Matrix: fine grained 8. Secondary Minerals: yellowish green fillings, up to 1 mm. 9. Encrustations: thin Mn coating 10. Comment: relatively fresh, good for Ar-Ar	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR-5-3	1. Rock Type: volcanic, somewhat fresh 2. Size: 8x7x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish, lighter grey-tan around margins 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Plg 1-3%, up to 2 mm, fresh. Ol (altered) 7-10%, approx. 0.5 mm 7. Matrix: Fine-grained 8. Secondary Minerals: Tan alteration around margins 9. Encrustations: thin Mn coating 10. Comment: Some fresh Plg, may be useful for Ar/Ar, but not much	x	x	1-2					
SO249-DR-5-4	1. Rock Type: plutonic, somewhat fresh 2. Size: 10x9x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: Greyish, some brown/red staining 5. Texture / Vesicularity: massive, <1% phenocrysts 1-2 mm 6. Phenocrysts: Plg, <1%, 1-2mm, fresh 7. Matrix: fine grained 8. Secondary Minerals: none 9. Encrustations: thin Mn-Fe crust 10. Comment: fresh Plg in very small amounts may be good for Ar/Ar dating	x	x	1-2					
SO249-DR-5-5	1. Rock Type: volcanic, relatively fresh 2. Size: 11x9x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish 5. Texture / Vesicularity: porphyritic, 1% vesicles 6. Phenocrysts: Plg, 7-10%, fresh, 0.5-1 mm. Ol, 15-20%, altered, <1 mm 7. Matrix: fine grained 8. Secondary Minerals: none 9. Encrustations: thin Mn-Fe coating 10. Comment: fresh Plg, good for Ar/Ar dating	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR-5-6	1. Rock Type: Volcanic, somewhat fresh 2. Size: 12x9x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish to tan-grey 5. Texture / Vesicularity: porphyritic, 1% vesicles 6. Phenocrysts: Plg, relatively fresh, 7-10%, 0.5-3 mm. Ol, altered, 10-15%, <1 mm 7. Matrix: fine grained 8. Secondary Minerals: light Fe-staining throughout? 9. Encrustations: thin Mn-Fe coating 10. Comment: some fresh Plg, may be useful for Ar/Ar dating	x	x	2					
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE

SO249-DR-5-7	1. Rock Type: diabasic? volcanic? fresh core, altered margin 2. Size: 12x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey core, tan/grey margin 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Ol, 5-7%, fresh in core, altered in margin, 0.5-1 mm 7. Matrix: fine to medium-fine grained 8. Secondary Minerals: red-brown alteration color 9. Encrustations: thin Mn coating 10. Comment: fresh Plg + Ol	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR-5-8	1. Rock Type: volcanic, somewhat altered 2. Size: 12x10x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light greyish 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Plg, 10-15%, slightly altered, 0.5-2 mm. Ol, 5-7%, altered, <1 mm. 7. Matrix: fine grained 8. Secondary Minerals: tan Fe-stained matrix, zeolite? 9. Encrustations: thin Mn-Fe coating 10. Comment: numerous filled veins (zeolite?) maybe not useful for Ar/Ar	x	x	2-3					
SO249-DR-5-9	1. Rock Type: volcanic, somewhat altered 2. Size: 10x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: tanish 5. Texture / Vesicularity: porphyritic, <1% vesicles 6. Phenocrysts: Plg, 5-7%, altered, 0.5-1 mm 7. Matrix: fine grained 8. Secondary Minerals: tan-red Fe staining, Mn dendrites 9. Encrustations: thin Mn+Fe coating 10. Comment: signs of alteration throughout. Not good for Ar/Ar dating	x	x	3					
SO249-DR-5-10	1. Rock Type: volcanic, partially altered 2. Size: 20x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish to red-grey 5. Texture / Vesicularity: porphyritic, 1% vesicles 6. Phenocrysts: Plg, partially fresh, 5-7%, 1-2 mm. Ol, altered, 3-5%, 0.5-1.5 mm 7. Matrix: fine-grained 8. Secondary Minerals: Qtz veining, red-brown Fe-staining 9. Encrustations: thin Fe-Mn crust 10. Comment: devitrified glass rim may contain some fresh glass. Numerous veins, some filled with Qtz. Some fresh glass may be good for spot analysis, but probably not Ar/Ar.	x	x	2-3					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR-5-11	1. Rock Type: volcanic/diabasic? partially altered 2. Size: 14x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish to tan-grey 5. Texture / Vesicularity: porphyritic, 1-3% vesicles 6. Phenocrysts: Plg, fresh to somewhat altered, 7-10%, 1-2 mm; Ol, altered, 1%, 1 mm 7. Matrix: fine to medium-fine grained 8. Secondary Minerals: Zeolite in altered Plg? Also red staining 9. Encrustations: thin Mn-Fe coating 10. Comment: some fresh Plg, may be good for Ar/Ar	x	x	1-2					
SO249-DR-5-12	1. Rock Type: volcanic, partially altered 2. Size: 12x10x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish tan 5. Texture / Vesicularity: porphyritic, 1-3% vesicles 6. Phenocrysts: Plg, mostly fresh, 10%, 1-3 mm. Ol, altered, <1%, 1 mm 7. Matrix: Fine to medium, Plg? 8. Secondary Minerals: tan-red Fe staining 9. Encrustations: thin Fe-Mn coating 10. Comment: fresh Plg good for Ar/Ar, rock contains numerous veins	x	x	1-2					
SO249-DR-5-13	1. Rock Type: volcanic, partially altered 2. Size: 10x7x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey, tan, reddish 5. Texture / Vesicularity: Porphyritic, 1% vesicles 6. Phenocrysts: Plg, somewhat fresh to altered, 7-10%, 1-3 mm. Ol, altered, 3-5%, 1-2 mm 7. Matrix: fine, altered Fsp? 8. Secondary Minerals: red staining, zeolites(?) in matrix 9. Encrustations: thin Fe-Mn coating 10. Comment: numerous veins with alteration, prepare carefully. Probably not useful for Ar/Ar	x		2-3					
SO249-DR5-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR6

Adams Seamount. Northern slope, step on the slope near the top of the seamount, aligns with bend fault cutting seamount

Dredge on bottom UTC 09/06/16 21:34hrs, lat 50°01.89'N, long 176°16.10'W, depth 4000 m
Dredge off bottom UTC 09/06/16 22:56hrs, lat 50°01.43'N, long 176°16.08'W, depth 3492 m

total volume: full

Comments: Mostly fragments of pillow-lavas, hyaloclastites, minor group of subaerially erupted/oxidized lavas, some sediments. Priority: many samples contain fresh glass (1, 2, 3, 4, 5, 6, 7, 16-25, X-samples). whole rock of sampe -10 = freshest of all. Samples -26 to -28: volcanic breccia special type!

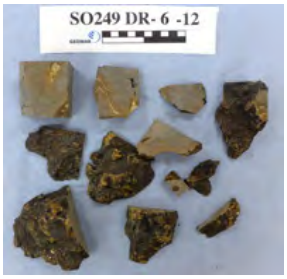
Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-1	1. Rock Type: volcanic rock with glassy margin (0.5-1 cm). Pillow lava 2. Size: 20x17x12 cm 3. Shape / Angularity: rounded 4. Color of cut surface: light grey with few small orange parts (= filled vesicles) and a few white spots (phenocrysts). Rim: Dark grey & brownish-orange, white glassy outside (palagonite) + parts of fresh glass (black) 5. Texture / Vesicularity: few vesicles (mm-mm's size) approx. 5%, mostly not filled 6. Phenocrysts: sparse clusters of Fsp glomerocrysts, 3-4 mm. Small Ol. 8. Secondary Minerals: Orange (maybe ironhydroxide?) 10. Comment: abundant fresh glass in chilled margin for geochemistry	x			x		MSC_SK	TS by Airfreight, GC taken out	
SO249-DR6-2	1. Rock Type: volcanic rock with glassy rim (0.5-1 cm) on one side of the rock. Pillow lava 2. Size: 10x10x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey, some white-dark grey phenocrysts, few orange vesicle filling, glassy rim (dark grey-black, few whitish phenocrysts). Outside: glassy-orange-white (palagonite) 5. Texture / Vesicularity: Approx. 10% vesicles, 1-5 mm diameter, almost all unfilled, filled ones are orange 6. Phenocrysts: Fsp glomerocrysts (greyish) in rock & rim, diameter 2-6 mm 8. Secondary Minerals: orange, maybe Fe oxyhydroxide 10. Comment: fresh glass rim good for geochemistry	x			x				
SO249-DR6-3	1. Rock Type: volcanic rock with glassy rim (0.5-1 cm) 2. Size: 19x14x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light grey, few light-dark grey-black phenocrysts, few orange vesicle fillings 5. Texture / Vesicularity: approx. 10% mostly small vesicles, 1.5-2 mm dia. 6. Phenocrysts: Fsp glomerocrysts, 3-5 mm diameter 8. Secondary Minerals: orange = Fe oyxhydroxide 10. Comment: glassy rim just on one side, but good enough for geochemistry				x				
SO249-DR6-4	1. Rock Type: Volcanic rock with glassy rim on one side (0.5 cm) 2. Size: 19x14x14cm 3. Shape / Angularity: rounded 4. Color of cut surface: light grey with lighter round patch (aprox. 12 x 4 cm). Few orange-filled vesicles. Light greyish fresh Ol phenocrysts 5. Texture / Vesicularity: approx. 10% mostly small vesicles, larger vesicles closer to margin. Mostly not filled & few orange fillings 6. Phenocrysts: Fsp glomerocrysts (2-7 mm). Ol phenocrysts (<1 cm) 8. Secondary Minerals: orange = Fe(?) 10. Comment: glassy rim just on one side -> geochemistry. Special note: big Ol phenocrysts								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-5	1. Rock Type: volcanic rock with glassy margin on one side (1-2cm thick) 2. Size: 14x10x10 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey with some darker patches, few orange vesicle fillings. Rim: 1-2cm darkgrey to black glass with abundant orange palagonite 5. Texture / Vesicularity: silghtly vesicular, 7%, 2-4mm diameter 6. Phenocrysts: Fsp glomerocrysts (3-6mm) 10. Comment: glassy rim good for geochemistry				x				
SO249-DR6-6	1. Rock Type: volcanic rock with glassy margin almost around the entire piece 2. Size: 15x13x11 cm 3. Shape / Angularity: rounded 4. Color of cut surface: light to drak grey core, dark grey rim with very few orange vesicle fillings 5. Texture / Vesicularity: minor vesicles <1%, few mm in diameter 6. Phenocrysts: Fsp glomerocrysts 10. Comment: thick glassy rim, may be difficult to prepare fresh glass				x				
SO249-DR6-7	1. Rock Type: volcanic rock with glassy rim on one side; but apparently no fresh glass 2. Size: 16x11x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: see sample -5 5. Texture / Vesicularity: small vesicles, 7%, 1-2 mm. Large vesicles towards the glassy rim, 5mm diameter 6. Phenocrysts: few Fsp glomerocrysts 2-7mm 10. Comment: almost no fresh glass				x				
SO249-DR6-8	1. Rock Type: volcanic rock with glassy rim on one side; but apparently no fresh glass 2. Size: 5x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark-blue greyish with some brown staining 5. Texture / Vesicularity: <1% vesicles, some filled with Fe-oxyhydroxide 6. Phenocrysts: few Fsp glomerocrysts < 2mm 10. Comment: might require careful handling due to veins								
SO249-DR6-9	1. Rock Type: see sample -8; <1cm chilled margin 2. Size: 14x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey with some darker patches & darker grey towards rim 5. Texture / Vesicularity: 10% vesicles, mostly unfilled, larger 3-4mm vesicles towards rim 6. Phenocrysts: few Fsp glomerocrysts								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-10	1. Rock Type: volcanic rock, probably freshest whole rock of dredge 2. Size: 22x19x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey with few ca. 1mm vesicles filled with white material 5. Texture / Vesicularity: few vesicles, 1-2mm, 1%, filled 6. Phenocrysts: very few 8. Secondary Minerals: <1%, 1-2mm filled vesicles 10. Comment: freshest aphyric rock of entire dredge	x	x				MSC_SK	TS+GC by Airfreight	
SO249-DR6-11	1. Rock Type: volcanic 2. Size: 17x13x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey with light brownish staining 5. Texture / Vesicularity: dense 6. Phenocrysts: aphyric 7. Matrix: fine grained 8. Secondary Minerals: cracks lined with Mn coating 10. Comment: fairly fresh rock; good for geochemistry	x	x						
SO249-DR6-12	1. Rock Type: volcanic rock, altered along cracks filled with white - yellowish material 2. Size: 15x11x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey, reddish to brownish along cracks 5. Texture / Vesicularity: aphyric 7. Matrix: dense; <<1% vesicles, <0.5 mm, fine grained 8. Secondary Minerals: oxidation halos along cracks; Mn coating on outside	x	x						
SO249-DR6-13	1. Rock Type: volcanic rock, radial alteration halo grading from margin to inner part 2. Size: 10x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: vesicles, <5%; 0.1mm diameter 6. Phenocrysts: aphyric 7. Matrix: grey, fine grained 8. Secondary Minerals: orange Fe-Oxyhydroxide patches, Mn coating	x	x						
SO249-DR6-14	1. Rock Type: volcanic rock simiar to sample .13, slightly coarser, alteration restricted to cracks 2. Size: 13x12x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: dense 6. Phenocrysts: essentially aphyric with 5% Plg; up to 0.5mm 7. Matrix: fine grained 8. Secondary Minerals: brownish Fe-OH coatings	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-15	1. Rock Type: volcanic rock, radial alteration halo grading from outside to inside 2. Size: 14x10x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey in center grading into brownish alteration halo 5. Texture / Vesicularity: < 5% vesicles, 0.1-1mm, partl filled with Fe-OH 6. Phenocrysts: aphyric 7. Matrix: fine grained 8. Secondary Minerals: see point 5	x	x						
SO249-DR6-16	1. Rock Type: volcaniclastic, hyaloclastite, palagonized with abundant large chunks of fresh glass 2. Size: 18x16x11 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: orange-yellow palagonite, glass = black 6. Phenocrysts: large, cm-sized glass chunks 8. Secondary Minerals: palagonite 10. Comment: lots of fresh glass suitable for any geochemical analysis including noble gas				x				
SO249-DR6-17	1. Rock Type: volcaniclastic, similar to -16 2. Size: 12x9x8 cm 3. Shape / Angularity: angular 6. Phenocrysts: fresh glass chunks bit more abundant than in -16 10. Comment: see sample -16				x				
SO249-DR6-18	1. Rock Type: volcaniclastic, hyaloclastite, highly palagonitized 2. Size: 10x8x6 cm 3. Shape / Angularity: angular 6. Phenocrysts: no fresh glass visible								
SO249-DR6-19	1. Rock Type: volcaniclastic 2. Size: 11x8x7 cm 3. Shape / Angularity: subangular 6. Phenocrysts: along cut surface large glass chunk surrounded by mm-sized palagonitized glass chunks				x				
SO249-DR6-20	1. Rock Type: volcanic rock with fresh glassy margin, 2-3mm thick 2. Size: 8x6x4 cm 3. Shape / Angularity: subangular 8. Secondary Minerals: patches of palagonite 10. Comment: amount of glass good for spot analysis				x				

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-21	1. Rock Type: volcaniclastic, hyaloclastite 2. Size: 15x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: fresh glass in places 8. Secondary Minerals: palagonite 10. Comment: glass for spot analysis				x				
SO249-DR6-22	1. Rock Type: volcanic rock with volcaniclastic material attached 2. Size: 13x6x6 cm 3. Shape / Angularity: subrounded 6. Phenocrysts: little fresh glass mostly palagonitized 10. Comment: sample serves as back-up				x Gl?				
SO249-DR6-23	1. Rock Type: pillow margin with hyaloclastite (intrapillow breccia) attached; 1-1.5cm 2. Size: 13x11x7 cm 3. Shape / Angularity: angular 6. Phenocrysts: mostly palagonitized; verly little fresh glass				x Gl?				
SO249-DR6-24	1. Rock Type: volcanic rock with hyaloclastite attached 2. Size: 19x12x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: glass chunks common; partly fresh 8. Secondary Minerals: palagonite				x				
SO249-DR6-25	1. Rock Type: volcaniclastic, hyaloclastite with littles fresh glass 2. Size: 8x7x2 cm 3. Shape / Angularity: subrounded 8. Secondary Minerals: palagonite				x				
SO249-DR6-26	1. Rock Type: volcanic breccia; probably flow top of a subaerial lava flow 2. Size: 12x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: red oxidized 5. Texture / Vesicularity: scoria texture 9. Encrustations: patchy Mn-crust 10. Comment: sample not cut to preserve scoria texture								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-27	1. Rock Type: volcanic breccia (glass?) on one side of rock 2. Size: 9x9x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey; brownish alteration halo 5. Texture / Vesicularity: few large vesicles, up to 0.5cm, open 6. Phenocrysts: aphyric 7. Matrix: fine grained 10. Comment: if breccia glassy, then highly altered								
SO249-DR6-28	1. Rock Type: volcanic breccia similar to sample -26 2. Size: 6x6x3 cm 3. Shape / Angularity: angular 5. Texture / Vesicularity: scoria texture on one side 9. Encrustations: patchy Mn crust 10. Comment: sample not cut to preserve texture								
SO249-DR6-29	1. Rock Type: volcanic rock with altered glassy (?), breccia like outer rim on one side. 2. Size: 8x8x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey with brownish alteration halo 5. Texture / Vesicularity: very few (1%) vesicles filled with orange material 6. Phenocrysts: aphyric 7. Matrix: fine grained 10. Comment: core nearly unaltered								
SO249-DR6-30	1. Rock Type: volcaniclastic, glassy but mostly palagonite 2. Size: 5x4x3 cm 3. Shape / Angularity: subrounded 8. Secondary Minerals: palagonite 10. Comment: maybe fresh glass in the interior								
SO249-DR6-31	1. Rock Type: sediment made of altered glass 2. Size: 21x14x19 cm 3. Shape / Angularity: rounded 5. Texture / Vesicularity: radial texture 7. Matrix: fine to medium grained, coarse grained material partly attached to surface 8. Secondary Minerals: patchy Mn crust								
SO249-DR6-32	1. Rock Type: sediment made out of altered glass 2. Size: 13x7x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: yellow-brown partly black 5. Texture / Vesicularity: unfilled vesicles (0.5-1cm) 7. Matrix: fine grained								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR6-33x	large bag of 5 additional hyaloclastites similar to sample 16 through 25								
SO249-DR6-34x	pillow with glassy margin simlar to sample -1 and following. Vesicles filled with Cc								
SO249-DR6-35x	similar to sample 1 and following, 2-3cm glassy margin								
SO249-DR6-36x	3x volcanic breccia similar to sample -26 through -28								
SO249-DR6-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Appendix 2 (Leg1 Station Details and Rock Description)

SO249-DR7

Northern trench slope south of Adak Island. North-facing ridge on slope, northern slope of ridge from base to top

Dredge on bottom UTC 10/06/16 07:55hrs, lat 50°47.17'N, long 176°10.16'W, depth 5000 m

Dredge off bottom UTC 10/06/16 09:25hrs, lat 50°46.72'N, long 176°10.38'W, depth 4560 m

total volume: 1/4Full

Comments: Contained a variety of lithologies ranging from aphyric to Fsp phyric lavas to plutonics and metamorphic shists and local(?) solidified sediment. Notably a large variation in angularity is observed in most lithologies ranging from freshly broken to rounded and pebbles. The pebbles indicate subaerial weathering and transport. Unclear if some rocks are even ice rafted. In any case they seem to be collected by the northfacing slope which serves as a barrier for material reaching the base of the Aleutians. Priority samples are -3 Plg phyric basalt for GC and Ar-Ar dating, -1 and -7 aphyric basalt for GC, -13 coarse, angular granite for GC and possible U-Pb dating but this sample could be also a dropstone

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-1	1. Rock Type: volcanic? (aphyric basalt?), fresh 2. Size: 21x12x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-dark grey 5. Texture / Vesicularity: aphyric, no vesicles 7. Matrix: very fine-grained 8. Secondary Minerals: small reddish spots--altered Ol? 9. Encrustations: thin Fe coating 10. Comment: priority for dating and geochemistry! Possible sedimentary origin!, to confirmed by thin section. Good for geochemistry	2x	x	2				TS+GC to GW by Airfreight	
SO249-DR7-2	1. Rock Type: metavolcanic or mildly altered volcanic 2. Size: 14x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey/red-brown/tan (mottled) 5. Texture / Vesicularity: aphyric, 1-3% vesicles 6. Phenocrysts: dark red possibly altered Ol 1%, 1-2 mm; Plg (?) partially fresh 3%, 1-2 mm. 7. Matrix: cryptocrystalline 8. Secondary Minerals: vesicles partially filled with green-yellow crystals, white veining throughout. 9. Encrustations: thin Fe-Mn coating 10. Comment: careful preparation needed (pervasive veining). Need to examine thin section!	2x	x	2-3					
SO249-DR7-3	1. Rock Type: volcanic, fresh (Plg-bearing phyric basalt) 2. Size: 10x9x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: Dark grey 5. Texture / Vesicularity: porphyritic, 1-3% very tiny vesicles 6. Phenocrysts: Plg, fresh, 5-7%, 1mm. 7. Matrix: fine grained 9. Encrustations: thin Fe-Mn coating 10. Comment: Priority! Fresh Plg, good for Ar-Ar. Good for geochemistry.	x	x	1				TS+GC to GW by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-4	1. Rock Type: partially-altered volcanic (?) 2. Size: 8x7x5 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: Dark grey, some light grey mottling 5. Texture / Vesicularity: aphyric, 1-3% filled vesicles 7. Matrix: Fine-grained--Plg (lighter parts)? 8. Secondary Minerals: metal sulfides in vesicles-veins 9. Encrustations: thin Fe-Mn coating 10. Comment: prob. not good for Ar-Ar or GC due to alteration.	x		2-3					
SO249-DR7-5	1. Rock Type: sedimentary 2. Size: 9x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greyish-green, brown 5. Texture / Vesicularity: fine to very fine sand and mud 6. Phenocrysts: Plg fragments? 1-3%, <1mm 7. Matrix: fine or very fine (mud) 9. Encrustations: thin Fe coating 10. Comment: not useful for GC or Ar-Ar	x		3					
SO249-DR7-6	1. Rock Type: volcanic (altered?) similar to 2 and 4 2. Size: 7x6x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey with lighter mottling 5. Texture / Vesicularity: aphyric, 1-3% very fine vesicle 7. Matrix: fine/very fine, poss. Plg (lighter areas) 8. Secondary Minerals: some sulfides in vesicles? 9. Encrustations: thin Mn coating 10. Comment: appears altered; probably not useful for GC or Ar-Ar	x		3					
SO249-DR7-7A	1. Rock Type: fresh volcanic (aphyric basalt) 2. Size: 19x13x13 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey/dark grey 5. Texture / Vesicularity: aphyric, no vesicles visible 7. Matrix: Fine, appears to have fresh Plg 9. Encrustations: thin Fe-Mn coating 10. Comment: priority for geochemistry and Ar-Ar!	x		1					
SO249-DR7-7B	1. Rock Type: sedimentary (separated from 7A) 2. Size: 19x13x13 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish-tan 5. Texture / Vesicularity: mud/very fine sand 7. Matrix: fine/very fine (mud) 8. Secondary Minerals: Mn-dendrites 9. Encrustations: thin Fe-Mn coating 10. Comment: contains fragments of 7A			3					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-8	1. Rock Type: volcanic, fresh 2. Size: 8x8x2 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, no vesicles 6. Phenocrysts: Plg, fresh, 15-20%, 1 mm 7. Matrix: fine grained 9. Encrustations: very thin Fe-Mn coating 10. Comment: probably good for Ar-Ar, not priority	x		1-2					
SO249-DR7-9	1. Rock Type: volcanic, fresh to somewhat fresh 2. Size: 6x6x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark reddish 5. Texture / Vesicularity: medium coarse porphyritic, 3-5% vesicles 6. Phenocrysts: Plg, fresh, 20-25%, 1-2 mm. Hbl, fresh, 7-10%, 1 mm. Qtz, 1-3%, <1 mm. 7. Matrix: aphyric 9. Encrustations: thin Mn coating 10. Comment: fresh Plg good for Ar-Ar, but not priority.	x		1					
SO249-DR7-10	1. Rock Type: volcanic, altered 2. Size: 10x9x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Plg, partially altered, 7-10%, 1-3 mm. Px (?), altered, 3-5%, 1 mm. 7. Matrix: fine grained 8. Secondary Minerals: light and dark greenish minerals in altered Plg and Px 9. Encrustations: thin Mn coating 10. Comment: possibly not local, useless for Ar-Ar	x		3					
SO249-DR7-11	1. Rock Type: volcanic, altered 2. Size: 8x8x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, <1% vesicles 6. Phenocrysts: Plg altered, 7-10%, <1 mm. 7. Matrix: fine grained 9. Encrustations: thin Mn-Fe coating 10. Comment: possibly not local, useless for Ar-Ar	x		3					
SO249-DR7-12	1. Rock Type: volcanic, relatively fresh 2. Size: 9x5x3 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, <1% vesicles 6. Phenocrysts: Plg moderately altered, 7-10%, up to 1 mm. 7. Matrix: fine grained 9. Encrustations: thin Mn-Fe coating	x		3					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-13	1. Rock Type: plutonic, relatively fresh granite 2. Size: 23x19x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey to brownish 5. Texture / Vesicularity: pegmatitic, no vesicles 6. Phenocrysts: Plg up to 1cm, fresh 15%, opaque phases <5%up to 5 mm, micas up to 5%. 7. Matrix: medium to coarse grained 9. Encrustations: thin Mn-Fe coating 10. Comment: possibly for for Ar-Ar and U-Pb but most likely represents a dropstone	SAS 2x	x	1-2					
SO249-DR7-14	1. Rock Type: plutonic relatively fresh 2. Size: 7x19x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: light to dark grey 5. Texture / Vesicularity: fully crystallized, no vesicles 6. Phenocrysts: Plg up to 2cm, fresh 10%, micas up to 1 mm 5%, Px up to 1 mm 7% 7. Matrix: fine to medium grained 8. Secondary Minerals: some greenish parts around the Px and mica 9. Encrustations: thin Mn-Fe coating	SAS 2x		2					
SO249-DR7-15	1. Rock Type: metamorphic, may be meta-igneous 2. Size: 15x6x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: light white-greenish 5. Texture / Vesicularity: crystallized, vesicles <1% 7. Matrix: medium grained 9. Encrustations: thin Mn-Fe coating 10. Comment: protolite not clear	SAS 2x							
SO249-DR7-16	1. Rock Type: plutonic relatively fresh 2. Size: 12x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey to dark grey 5. Texture / Vesicularity: crystallized, no vesicles 6. Phenocrysts: Plg up to 2mm relatively fresh 7-10%, Px up to 1 mm 5% 7. Matrix: fine grained 8. Secondary Minerals: may be Chl 9. Encrustations: thin Fe-Mn coating	SAS 2x							
SO249-DR7-17	1. Rock Type: plutonic relatively fresh 2. Size: 12x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: crystallized, no vesicles 6. Phenocrysts: Plg up to 2mm relatively fresh 7-10%, Px up to 1 mm 5% 7. Matrix: fine grained 8. Secondary Minerals: may be chlorite 9. Encrustations: thin Fe-Mn coating	SAS 2x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-18	1. Rock Type: Plutonic, fresh core, rim possibly atered 2. Size: 13x9x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: holocrystalline, 1-2 mm 7. Matrix: medium grained Plg, Bt, Phlogopite, Qtz? 8. Secondary Minerals: Chl, zeolite?? 9. Encrustations: thin Fe-Mn coating 10. Comment: likely a dropstone	SAS 2x		1-2					
SO249-DR7-19	1. Rock Type: metamorphic (Hbl schist) 2. Size: 14x10x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey/black 5. Texture / Vesicularity: foliated 7. Matrix: foliations of black and light/white minerals, Hbl 8. Secondary Minerals: Cc, some sulfides 9. Encrustations: Fe-Mn coating 10 Comment: likely a dropstone	SAS 2x							
SO249-DR7-20	1. Rock Type: metamorphic (Meta chert) 2. Size: 13x6x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey, black 5. Texture / Vesicularity: foliated 7. Matrix: well developed foliations (not flaky) - mica? Long grey-light grey Px up to 20 mm long 9. Encrustations: some thin Fe-Mn coating 10. Comment: likely a dropstone	SAS 2x							
SO249-DR7-21	1. Rock Type: metamorphic (jasper?) 2. Size: 13x11x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey with white or pale green vein, some dark red or red-brown patches 5. Texture / Vesicularity: massive, fine grained 7. Matrix: fine grained, silica veining? 8. Secondary Minerals: Fe-oxides, chlorite? 9. Encrustations: thin Fe-Mn coating 10. Comment: jasper??, likely a dropstone	SAS 2x						similar to SO249-DR7-2	
SO249-DR7-22	1. Rock Type: meta-volcaniclastic 2. Size: 18x17x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey to black 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: rounded angular lighter grey clasts with green minerals in them 1-7mm, 7. Matrix: fine to medium Pl and Px? 8. Secondary Minerals: Chl? 9. Encrustations: Fe-Mn coating	SAS 2x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR7-23	1. Rock Type: sedimentary / meta-sedimentary 2. Size: 15x10x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey/black 5. Texture / Vesicularity: medium 7. Matrix: medium, angular to subangular fragments of minerals - Plg, Hbl 9. Encrustations: thin Fe-Mn coating 10. Comment: one half is fresh other weathered	SAS 2x							
SO249-DR7-24	1. Rock Type: semi-consolidated sediment 2. Size: 15x11x10 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: mud 1-3% lithic fragments (fine sand size) 7. Matrix: greenish medium, fine sand size reddish, Fe-spots, lighter grey, lithic/mineral fragments, black Mn-spots								
SO249-DR7-25	1. Rock Type: semi-consolidated mudstone 2. Size: 15x11x6 cm 3. Shape / Angularity: subangular/subrounded 4. Color of cut surface: greenish grey, brown 5. Texture / Vesicularity: mud 1-3% fine sand 7. Matrix: 1-3% fine sand size lighter grey fragments, black Mn, red Fe spotting, rests is mud 9. Encrustations: black Mn coating 10. Comment: similar to -24, but more pervassive Mn infiltration and numerous worm burrows							similar to SO249-DR7-24	
SO249-DR7-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR8

Adak canyon. Lower part of SE facing canyon wall

Dredge on bottom UTC 10/06/16 16:48hrs, lat 51°13.96'N, long 177°22.78'W, depth 3720 m

Dredge off bottom UTC 10/06/16 18:22hrs, lat 51°14.44'N, long 177°22.66'W, depth 3403 m

total volume: one stone

Comments: Semiconsolidated sediment (meta-mudstone)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR8-1	1. Rock Type: metamorphic ? (mudstone?) 2. Size: 10x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark brown-grey 5. Texture / Vesicularity: very fine-grained, some ca. 1mm foliation or remnant of layering, mostly massive 7. Matrix: very fine 9. Encrustations: thin Fe-Mn coating								
SO249-DR8-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR9

Adak canyon. Eastern slope of the canyon

Dredge on bottom UTC 10/06/16 21:12hrs, lat 51°20.39'N, long 177°08.03'W, depth 3500 m

Dredge off bottom UTC 10/06/16 00:07hrs, lat 51°20.73'N, long 177°07.31'W, depth 2900 m

total volume: nearly full

Comments: A large variety of volcanic rocks recovered: 1) Amph-Fsp phyric dense lava; 2) porphyritic Fsp-lava with minor mafic minerals; 3) vesicular Fsp rich lava; 4) Ol-Fsp lava !; 5) breccias consist of volcanic clasts, and 6) reddish volcanic rocks of subareal origin. Priority samples: -1, -8, -11, -16, -18, -21, -23 and -28.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-1	1. Rock Type: volcanic rock, part of large rock 2. Size: 22x20x16 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, dense matrix 6. Phenocrysts: Amph (7-10%), Fsp (<5%) 7. Matrix: dense matrix 8. Secondary Minerals: coating along cracks, otherwise fresh 10. Comment: this is the first of four porphyric lavas with Amph - Plg phenocrysts. They are taken as they represent the mafic spectrum of the dredge.	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR9-2	1. Rock Type: volcanic rock similar to -1 2. Size: 17x15x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, weathering halo (brownish grey) 5. Texture / Vesicularity: porphyric, dense matrix, few cracks 6. Phenocrysts: Amph, Plg (<5%) 7. Matrix: dense matrix 8. Secondary Minerals: oxidized, alteration halo 10. Comment: see sample -1	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-3	1. Rock Type: volcanic rock similar to -1 2. Size: 17x13x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, dense matrix, few cracs 6. Phenocrysts: Amph (7%), Plg (<5%) 7. Matrix: dense matrix 8. Secondary Minerals: few filled cracks 10. Comment: see sample -1	x	x						
SO249-DR9-4	1. Rock Type: volcanic rock similar to -1 2. Size: 24x13x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, dense matrix, few cracs 6. Phenocrysts: Amph (10%), Plg (<5%) 7. Matrix: dense matrix 8. Secondary Minerals: cracks with small alteration rim 10. Comment: see sample -1	x	x						
SO249-DR9-5	1. Rock Type: volcanic rock 2. Size: 16x14x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark to medium grey, alteration halo 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (10-15%), dark minerals (<2%, <1 mm) 7. Matrix: dense matrix 10. Comment: second group of volcanic rocks (porphyric) with more Fsp and less mafic minerals.	x	x						
SO249-DR9-6	1. Rock Type: volcanic rock 2. Size: 15x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (~7%), mafic minerals (~7%) 7. Matrix: dense matrix, alteration halo; small enclave in one corner 10. Comment: see -5	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR9-7	1. Rock Type: volcanic rock 2. Size: 13x12x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, alteration halo 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15%), mafic minerals (~5-7%) 7. Matrix: dense matrix, alteration halo 8. Secondary Minerals: refilled cracks 10. Comment: see -5	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-8	1. Rock Type: volcanic rock, part of large block 2. Size: 30x26x23 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, alteration halodark grey (inner) to brownish (outer) 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15-20%), mafic minerals (7-10%) 7. Matrix: dense matrix 10. Comment: see -5	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR9-9	1. Rock Type: volcanic rock 2. Size: 18x17x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, alteration halo grey to brownish 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15%), mafic minerals (ca 5-7%) 7. Matrix: dense groundmass 8. Secondary Minerals: oxidation along cracks 10. Comment: see -5	x							
SO249-DR9-10	1. Rock Type: volcanic rock 2. Size: 14x13x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, alteration halo bit darker 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (40%), mafic minerals (~5%) 7. Matrix: dense matrix 8. Secondary Minerals: altered minerals void spaces 10. Comment: see -5	x	x						
SO249-DR9-11	1. Rock Type: volcanic rock 2. Size: 17x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey, alteration halo dark grey to brownish 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15%), dark minerals (~5%), green minerals (~5%) 7. Matrix: dense matrix 10. Comment: see -5	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR9-12	1. Rock Type: volcanic rock (part of a large rock) 2. Size: 33x23x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, alteration halo grey to brownish 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15%), dark minerals (~2%), green minerals (altered yellow) (~10%) 7. Matrix: dense matrix 10. Comment: see -5	x	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-13	1. Rock Type: volcanic rock 2. Size: 18x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (10%), mafic minerals (~5%) 7. Matrix: dense matrix 8. Secondary Minerals: filled cracks 10. Comment: see -5	x	x						
SO249-DR9-14	1. Rock Type: volcanic rock 2. Size: 30x21x18 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, brownish alteration halo 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (10%), mafic minerals (1%) 7. Matrix: dense matrix 10. Comment: see -5	x							
SO249-DR9-15	1. Rock Type: volcanic rock 2. Size: 19x16x13 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, patchy reddish-brown alteration areas 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (20%) 7. Matrix: dense matrix 8. Secondary Minerals: red patches 10. Comment: see -5	x	x						
SO249-DR9-16	1. Rock Type: volcanic rock 2. Size: 14x13x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, visicules 7% (0.1-1 mm) 6. Phenocrysts: Fsp (20%) 7. Matrix: dense matrix 8. Secondary Minerals: vesicles filled with white/yellow/blue/green material 10. Comment: Vesicular volcanic rock	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR9-17	1. Rock Type: volcanic rock 2. Size: 13x13x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, 10% vesicles elongated 6. Phenocrysts: Fsp (15%) 7. Matrix: dense matrix 8. Secondary Minerals: vesicles partly filled with white/yellow/blue/green material 10. Comment: vesicular volcanic rock	x					similar to SO249-DR9-16		

SO249-DR9-18	1. Rock Type: volcanic rock 2. Size: 18x15x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, visicules rounded (0.1cm, 10%) to elongated (>1cm, 5%) 6. Phenocrysts: Fsp (10%) 7. Matrix: dense matrix 8. Secondary Minerals: vesicles partly filled with white/yellow/blue/green material 10. Comment: vesicular volcanic rock	x	x				similar to SO249-DR9-16		
SO249-DR9-19	1. Rock Type: volcanic rock 2. Size: 12x11x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, visicules rounded (0.1cm, 20%) to elongated (>1cm, 3%) 6. Phenocrysts: Fsp (10%) 7. Matrix: dense matrix 8. Secondary Minerals: vesicles mostly unfilled, especially small ones 10. Comment: vesicular volcanic rock	x					similar to SO249-DR9-16		
SO249-DR9-20	1. Rock Type: volcanic rock 2. Size: 13x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, visicules rounded (0.1cm) to elongated (>1cm) 6. Phenocrysts: Fsp (7%) partly altered 7. Matrix: dense matrix 10. Comment: vesicular volcanic rock	x	x				similar to SO249-DR9-16		
SO249-DR9-21	1. Rock Type: volcanic 2. Size: 14x14x11 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey, thin (0.5cm) brownish alteration halo 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (10%), Ol altered (7%), black minerals - (2%) 7. Matrix: dense matrix 8. Secondary Minerals: small cracks filled with white material 10. Comment: Ol-bearing volcanic rock (!)	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR9-22	1. Rock Type: volcanic 2. Size: 14x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (7%), Ol altered (less than in -21) (5%), black minerals (7%) 7. Matrix: dense matrix 8. Secondary Minerals: cracks filled with white material 10. Comment: Ol-bearing volcanic rock (!)	x	x				similar to SO249-DR9-21	TS+GC to GW by Airfreight	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-23	1. Rock Type: volcanic breccia 2. Size: 12x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium (clasts) to dark grey (matrix) 5. Texture / Vesicularity: clasts: different sizes, angular to subangular, porphyric matrix 6. Phenocrysts: Fsp (7-10%), black minerals - (7-10%) 7. Matrix: dense matrix, Fsp (7-10%), black minerals - (7%), red alteration 8. Secondary Minerals: filled cracks 10. Comment: Ol-bearing volcanic rock (!)	x							
SO249-DR9-24	1. Rock Type: volcanic rock 2. Size: 19x14x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, brownish alteration halo (0.5cm) 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15%), greenish minerals (2%), black minerals - (1%) 7. Matrix: dense matrix 10. Comment: high amount of Plg	x	x				similar to SO249-DR9-5		
SO249-DR9-25	1. Rock Type: breccia 2. Size: 17x13x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey with reddish components 5. Texture / Vesicularity: poorly sorted 6. Phenocrysts: "clast": 1. porphyric, reddish matrix, 20% Fsp, 7% mafic minerals; 2. medium grey matrix: 15% Fsp, red components 5%, black minerals 10% 7. Matrix: dense matrix	x					similar to SO249-DR9-23		
SO249-DR9-26	1. Rock Type: breccia with large (10cm) well rounded volcanic rock 2. Size: 23x17x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: large clasts: medium grey; breccia: dark grey 5. Texture / Vesicularity: both poorly sorted 6. Phenocrysts: breccia: 10% Fsp, 1% red components, 1% green mineral; light grey clasts 3%, subangular; big clasts: 10% Fsp, 2% green minerals, 5% black minerals 7. Matrix: dense matrix	x					similar to SO249-DR9-23		
SO249-DR9-27	1. Rock Type: breccia 2. Size: 21x16x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, reddish components <2cm; alteration halo 5. Texture / Vesicularity: poorly sorted 6. Phenocrysts: red volc. clasts: 30% Fsp, 10% black minerals, 5% green minerals; groundmass: 10% green minerals, 5% black minerals, Fsp 10% 7. Matrix: dense matrix 8. Secondary Minerals: white veins	x					similar to SO249-DR9-23		

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR9-28	1. Rock Type: volcanic rock 2. Size: 10x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: red 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp 30%, black minerals 10% 7. Matrix: dense matrix 8. Secondary Minerals: filled cracks 10. Comment: most reddish volcanic rocks of DR-9 indicates subaerial eruption	x	x						
SO249-DR9-29	1. Rock Type: breccia 2. Size: 11x10x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: red matrix; <0.5cm alteration halo 5. Texture / Vesicularity: poorly sorted 6. Phenocrysts: 25% red volc. clasts; matrix: black minerals 5%, green minerals 2-3%, Fsp 10% 7. Matrix: fine grained 8. Secondary Minerals: white veins	x					similar to SO249-DR9-23		
SO249-DR9-30x	sample is similar to samples -1 to -4								
SO249-DR9-31x	similar to samples -5 to -15								
SO249-DR9-31x	similar to sample 26								
SO249-DR9-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR10

Adak canyon. Base of western slope, ca. 1.5 miles NE of DR8

Dredge on bottom UTC 11/06/16 04:04hrs, lat 51°14.89'N, long 177°20.99'W, depth 3700 m

Dredge off bottom UTC 11/06/16 05:25hrs, lat 51°15.24'N, long 177°21.28'W, depth 3400 m

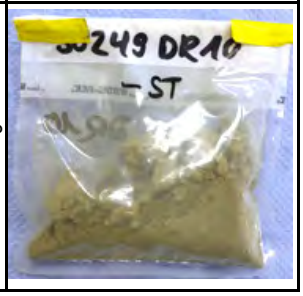
total volume: 1/4 full

Comments: Plg-phyric relatively fresh basalts, variably solidified sediments. Priority samples: -1 and -3, both good for chemistry and Ar/Ar-Dating

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR10-1	1. Rock Type: volcanic 2. Size: 11x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, mm thick alteration rim in brownish color, light grey and black minerals 5. Texture / Vesicularity: porphyric, 7-10% vesicles mostly round with 2-3mm in diameter, more than 50% of the vesicles are freshly filled with light grey & yellowish material 6. Phenocrysts: 5% black minerals (1mm ∅), 15% Fsp 2-5mm 7. Matrix: dense and fine matrix 10. Comment: freshest, best and biggest sample -> geochemistry	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR10-2	1. Rock Type: volcanic 2. Size: 10x5x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey, small mm thick alteration rim, light grey and white minerals, white transparent crystals in big vesicles 5. Texture / Vesicularity: 3% vesicles mostly round 2-3mm ∅, some vesicles are bigger and elongated with crystals in them, some vesicles partly filled with fresh material; porphyric texture 6. Phenocrysts: 15-20% Fsp (2-5mm); 1-2% black minerals with 1mm ∅ 7. Matrix: dense and fine matrix	x					MSC_GW	similar to SO249-DR10-1	
SO249-DR10-3	1. Rock Type: volcanic 2. Size: 14x9x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey (darker than DR10-1), brown alteration rim 2-7mm 5. Texture / Vesicularity: 1% vesicles, mostly round, 2-4mm ∅, some freshly filled 6. Phenocrysts: 25-30% Fsp 2-7mm; some transparent (1%) minerals mostly round & 5mm ∅ 7. Matrix: dense and fine matrix 10. Comment: can be used for geochemistry, carefull preparation because of cracks; some differences to the porphyric texture of DR10-1 & DR10-2	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR10-4	1. Rock Type: volcanic 2. Size: 10x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium-dark grey, almost no alteration rim, light grey whitish minerals 5. Texture / Vesicularity: porphyric; 3-5% vesicles, very round, 3-5mm, partly filled with fresh light grey material 6. Phenocrysts: 10% Fsp 2-7mm ∅ 7. Matrix: dense and fine matrix 10. Comment: rather small sample and thin, no black minerals	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR10-5	1. Rock Type: volcanic 2. Size: 10x9x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey like DR10-1, light grey-white minerals; 1cm alteration rim: greenish with small black & white minerals 5. Texture / Vesicularity: porphyric; 2% vesicles, very round 2-5mm ∅, sometimes filled with fresh green-blue-grey material 6. Phenocrysts: 25% Fsp, 2-7mm ∅ 7. Matrix: dense and fine matrix 10. Comment: almost only Fsp minerals and thicker alteration rim	x							
SO249-DR10-6	1. Rock Type: sediment 2. Size: 22x15x12 cm 3. Shape / Angularity: round 4. Color of cut surface: beige, slightly darker & lighter areas 7. Matrix: very fine (mud)								
SO249-DR10-7	1. Rock Type: sediment 2. Size: 20x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: beige-dark grey-greenish-white-light grey-black. Multicolor due to gradation of different grain sizes and thick alteration rim 7. Matrix: dark grey and dense mud, angular and grains, gravel (subangular) black, white and green 10. Comment: big alteration rim, a lot of different sediment layers								
SO249-DR10-8	1. Rock Type: sediment 2. Size: 22x15x11 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark to medium grey, grains: white red, grey, brown; alteration rim more brownish instead of grey 7. Matrix: fine to medium sand and some coarser and finer grains 10. Comment: almost the whole rock is altered, not sorted								
SO249-DR10-9	1. Rock Type: sediment 2. Size: 12x11x9 cm 3. Shape / Angularity: round 4. Color of cut surface: grains with different colors (grey, green, blue, red, brown, black, yellow, white...) 7. Matrix: angular to rounded grains, medium sand to gravel 10. Comment: not sorted								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR10-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR11

Adak canyon. Exit of Adak Canyon entering the trench. E-W-striking step in trench slope

Dredge on bottom UTC 11/06/16 13:44hrs, lat 50°34.50'N, long 178°14.70'W, depth 4812 m

Dredge off bottom UTC 11/06/16 15:13hrs, lat 50°34.97'N, long 178°14.84'W, depth 4400 m

total volume: one rock

Comments: One rounded piece of Ol-basalt, fresh and good for chemistry and possibly Ar/Ar on g. m. Priority sample: -1 GC, Ol separate, Ar/Ar?

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR11-1	1. Rock Type: very fresh volcanic rock 2. Size: 15x13x9 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, some parts with less vesicularity and less Plg, more fresher part is fine-grained 6. Phenocrysts: Ol 40%; Plg 10-15%; CPx 5-10% 7. Matrix: fine-grained and very fresh 9. Encrustations: very thin Fe-Mn-crust 10. Comment: Mg-andesite, adakite?	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR11-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR12

Fore Arc Ridge, extension of Adak canyon. SSE-facing slope of Fore Arc Ridge from base to top

Dredge on bottom UTC 11/06/16 19:48hrs, lat 50°42.52'N, long 177°58.29'W, depth 4450 m

Dredge off bottom UTC 11/06/16 21:17hrs, lat 50°42.84'N, long 177°58.79'W, depth 3917 m

total volume: 1/2 full

Comments: A range of sedimentary rocks of variable grade of metamorphism: 1) Semiconsolidated mud, 2) breccias 3), sandstones/greywackes

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR12-1	1. Rock Type: sediment (mudstone) 2. Size: 38x33x33 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium to dark grey - greenish 5. Texture / Vesicularity: massive 7. Matrix: mud (silt, clay) 8. Secondary Minerals: brownish altered rim, 1cm 10. Comment: moderatly indurated								
SO249-DR12-2	1. Rock Type: sediment (conglomerate) 2. Size: 13x9x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium to dark grey - greenish 5. Texture / Vesicularity: conglomeratic, poor sorting 6. Phenocrysts: rounded mudstone clasts resemble sample DR12-1, ∅ 5-60mm 7. Matrix: mud to medium sand, visible grains are subangular 8. Secondary Minerals: minor Fe staining, spots of thin dark crust 10. Comment: sand matrix appears volcaniclastic?								
SO249-DR12-3	1. Rock Type: sediment (very coarse sandstone, fresh) 2. Size: 22x15x12 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey, brown, greenish, little grey grains 5. Texture / Vesicularity: massive, poorly sorted 6. Phenocrysts: mudstone clasts, volcanic clasts 7. Matrix: medium sand, subangular grains 8. Secondary Minerals: brownish altered rim 15mm thick, small patches of dark crust 10. Comment: few monomineralic grains	x							
SO249-DR12-4	1. Rock Type: sediment (very fine sandstone, altered) 2. Size: 16x10x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium brownish grey 5. Texture / Vesicularity: thinly laminated 7. Matrix: very fine sand 9. Encrustations: red brown staining <1mm 10. Comment: well indurated								
SO249-DR12-5	1. Rock Type: sediment (very fine sandstone) 2. Size: 10x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light grey 5. Texture / Vesicularity: massive, well sorted 7. Matrix: very fine sand and mud 8. Secondary Minerals: Cc in veins 9. Encrustations: dark grey crust 1-5mm thick on some areas	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR12-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR13

Amatignak Canyon. SW striking canyon wall in the lower section. SE dipping flank immediately above canyon floor.

Dredge on bottom UTC 12/06/16 06:58hrs, lat 50°58.74'N, long 179°39.27'W, depth 5426 m

Dredge off bottom UTC 12/06/16 10:03hrs, lat 50°58.95'N, long 179°40.04'W, depth 5050 m

total volume: few rocks

Comments: Solidified sediment + single volcanic rock (rounded), looks like diabase

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR13-1	1. Rock Type: volcanic rock 2. Size: 21x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Fsp (30%), black minerals (2%) 7. Matrix: fine grained 10. Comment: difficult to determine if volcanic or plutonic, may be diabase? Fsp good for dating.	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR13-2	1. Rock Type: sediment (mudstone) with 5% subrounded clasts 2. Size: 21x15x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: beige 5. Texture / Vesicularity: mud with subangular and subrounded clasts of sand and gravel								
SO249-DR13-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR14

Amatignak Canyon. Eastern flank of canyon. North facing slope of E-W striking nose

Dredge on bottom UTC 12/06/16 14:51hrs, lat 51°0.66'N, long 179°26.6'W, depth 5130 m

Dredge off bottom UTC 12/06/16 16:05hrs, lat 51°0.23'N, long 179°26.61'W, depth 4619 m

total volume: few rocks

Comments: Sedimentary rocks (ordered accordng to relative proportion). 1) fine grained sandstone, 2) semiconsolidated mudstone, 3) coarse grained sandstone/breccia (gravelite?), 4) fine grained aphyric metamorphosed sediment (alevrolite?)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR14-1	1. Rock Type: volcaniclastic breccia, variably altered 2. Size: 21x9x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: bluish-grey 5. Texture / Vesicularity: fine to coarse grains/clasts 6. Phenocrysts: 20-25% 2-3 mm clasts. 1-3% 10-20 mm clasts. 1% filled voids (white mineral). Few clasts are sedimentary; mainly volcanic or fragments of single crystals. Clasts include Px basalts, Plg basalt, poss. andesite?, and many <1mm red grains (Fe oxide? altered Ol?) 7. Matrix: fine (light bluish-grey cement) to medium sand (black, red, and bluish lithic fragments). 8. Secondary Minerals: brownish alteration rim 1-2 cm thick 9. Encrustations: thin Fe-Mn coating 10. Comment: clasts are variably altered, but may be good for laser ablation.	3x (1xSAS)							
SO249-DR14-2	1. Rock Type: volcaniclastic breccia 2. Size: 10x9x9 cm 3. Shape / Angularity: subrounded 10. Comment: Same as -1, but has a much smaller bluish core and thicker brown alteration rim (2-4 cm)	2x (1xSAS)							
SO249-DR14-3	1. Rock Type: volcaniclastic breccia 2. Size: 8x9x7 cm 3. Shape / Angularity: subrounded-rounded 10. Comment: same as -1 & -2, but with 2-5 cm alteration rim, without fragments/clasts >2 mm.								
SO249-DR14-4	1. Rock Type: Sedimentary (sandstone) 2. Size: 18x12x7 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: dark grey to greyish-tan 5. Texture / Vesicularity: fine sand and some mud, with mm-scale layering 7. Matrix: Appears to be same types of material as breccias (-1, -2, -3), but only contains fine sand and silt sizes 9. Encrustations: thin Mn-Fe coating 10. Comment: careful preparation: veins of Fe-oxide								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR14-5	1. Rock Type: sedimentary 2. Size: 9x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: very fine sand to silt. Fine layering <1mm scale, but not flakey or friable 7. Matrix: Very fine, some larger fragments appear basaltic 9. Encrustations: thin Fe coating								
SO249-DR14-6	1. Rock Type: sedimentary 2. Size: 8x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-dark grey 5. Texture / Vesicularity: very fine sand and silt--slightly siltier than #5 7. Matrix: similar to -5, very fine. Appears to have more Fe-oxide grains. 9. Encrustations: thin Fe coating 10. Comment: careful preparation due to veining								
SO249-DR14-7	1. Rock Type: sedimentary (mudstone), semi-consolidated 2. Size: 11x8x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: very fine, mud with some sand 7. Matrix: mud with about 1% very fine sand, some grains of Fe and Mn oxides 9. Encrustations: very thin Fe-Mn coating								
SO249-DR14-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR15

Amatignak Canyon. Lower part of SE facing canyon wall

Dredge on bottom UTC 12/06/16 20:03hrs, lat 50°57.21'N, long 179°27.48'W, depth 4900 m

Dredge off bottom UTC 12/06/16 21:32hrs, lat 50°56.86'N, long 179°27.00'W, depth 4188

total volume: 1/4 full

Comments: Predominantly sandstone, breccia, mudstone. Some igneous rocks. Priority -1 andesite, -2 to -4 basalts (subangular, Plg-Px phenocrysts). Basalts -2 to -4 most likely in situ rocks. In situ origin of andesite -1 is somewhat questionable, but good for geochemistry and Ar-Ar.

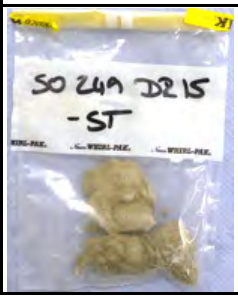
Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR15-1	1. Rock Type: volcanic (andesite), fresh 2. Size: 22x14x15 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium dark grey 5. Texture / Vesicularity: porphyritic, about 5% vesicles (?) 6. Phenocrysts: Plg, 7-10%, 1-3 mm, relatively fresh. Hbl, 5-7%, 1-5 mm, relatively fresh. Px (?), 3-5%, 1-3 mm, fresh. 7. Matrix: fine-grained 9. Encrustations: thin Mn coating 10. Comment: fresh Plg for Ar-Ar and geochemistry. Vesicles may be dissolved mineral voids.	3x (1 SAS)	x	1			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR15-2	1. Rock Type: volcanic, basalt? 2. Size: 17x11x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Plg, 3-5%, 1-2 mm, relativley fresh; Px: 5-7%, 0.5-3 mm, relativley fresh 7. Matrix: fine-grained 8. Secondary Minerals: none 9. Encrustations: thin Mn-Fe-coating 10. Comment: fresh Plg for Ar/Ar	3x	x	1-2			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR15-3	1. Rock Type: volcanic, basalt 2. Size: 12x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Plg, 3-5%, 1-2 mm, relativley fresh; Px, 5-7%, 0.5-3 mm, relativley fresh 7. Matrix: fine-grained 8. Secondary Minerals: none 9. Encrustations: thin Mn-Fe-coating 10. Comment: fresh Plg for Ar/Ar. Sample very similar to -2	x		1-2					
SO249-DR15-4	1. Rock Type: volcanic, basalt? 2. Size: 11x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, 15-20% vesicles, variably filled, 0.5-3 mm 6. Phenocrysts: Plg, 2-3%, 1-3 mm, fresh; Px, 1%, 1-2 mm, fresh 7. Matrix: fine-grained 8. Secondary Minerals: yellowish-white small hexagonal zeolites? lining vesicle walls, filling small vesicles 9. Encrustations: thin Mn-coating 10. Comment: fresh Plg for Ar/Ar	x	x	1-2			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR15-5	1. Rock Type: metamorphic, meta-plutonic? 2. Size: 11x9x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium greenish grey 5. Texture / Vesicularity: coarse grained 6. Phenocrysts: none 7. Matrix: coarse grained. Plg 20-30% 10. Comment: lots of Plg, good for Ar-Ar	2x (1 SAS)	x	1-2					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR15-6	1. Rock Type: Sediment, sandstone and mudstone 2. Size: 13x11x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium brownish grey 5. Texture / Vesicularity: laminated 7. Matrix: mud, medium grained sand 9. Encrustations: thin Fe-Mn coating w/dendrites 10. Comment: contact between sand and mud is sharp, lamination is wavy, no useful grains observed	2x (1 SAS)							
SO249-DR15-7	1. Rock Type: sedimentary, very fine sandstone 2. Size: 20x15x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brown/tan 5. Texture / Vesicularity: thinly laminated 7. Matrix: very fine sand 8. Secondary Minerals: Fe staining in fractures 9. Encrustations: thin Mn coating on one side								
SO249-DR15-8	1. Rock Type: sedimentary, fine sandstone 2. Size: 15x10x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brown 5. Texture / Vesicularity: massive 6. Phenocrysts: large volcanic clasts, 15 mm, contains possible Plg phenocrysts, 2 mm 7. Matrix: fine sand, few coarse grains 8. Secondary Minerals: none 9. Encrustations: thin Mn-coating 10. Comment: large clasts contain filled vesicles								
SO249-DR15-9	1. Rock Type: sedimentary, conglomerate 2. Size: 18x12x9 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey-brownish 5. Texture / Vesicularity: massive conglomeratic-50% matrix 6. Phenocrysts: volcanic sedimentary clasts <1 cm 7. Matrix: medium sand 8. Secondary Minerals: light gey-white void fill 9. Encrustations: thin Mn-coating 10. Comment: no usefull grains for geochemistry								
SO249-DR15-10	1. Rock Type: sedimentary, conglomerate 2. Size: 48x27x20 cm (part of large block) 3. Shape / Angularity: subangular 4. Color of cut surface: dark bluish grey 5. Texture / Vesicularity: massive conglomerate, 40% matrix 6. Phenocrysts: volcanic clasts < 1 cm 7. Matrix: medium sand 8. Secondary Minerals: light grey-white void fill 9. Encrustations: none 10. Comment: no usefull clasts for geochemistry	2x (1x SAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR15-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR16

Amatignak canyon. Lower SE slope of Amatignak canyon

Dredge on bottom UTC 13/06/16 02.36hrs, lat 50°52.86'N, long 179°35.18'W, depth 5523 m

Dredge off bottom UTC 13/06/16 04:14hrs, lat 50°52.45'N, long 179°34.90'W, depth 4991 m

total volume: 1/4 full

Comments: Two lithologies recovered 1) small fragments of slightly Plg-Amph? phyric lava (-1 to -6) and 2) volcaniclastic tuff (-7 to -15) along with sand and mustones (-16 to -18). Due to size GC slabs prepared only for -3 and -5, other lava fragments should be checked for petrography if similar / distinct. -1 and -2 are macroscopically the freshest samples. The tuffs contain abundant Fsp for dating but genesis of these rocks needs to be clarified by petrography prior to further processing.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR16-1	1. Rock Type: volcanic, relatively fresh? 2. Size: 10x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, dense, no vesicles 6. Phenocrysts: Fsp, 7-10%, 2-5 mm, slightly altered (some are fresh). Mafic minerals 2%, 1-2 mm. 7. Matrix: dense and fine-grained matrix 9. Encrustations: thin Fe-Mn crust 10. Comment: sample too small for GC	x							
SO249-DR16-2	1. Rock Type: volcanic, relatively fresh 2. Size: 9x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, dense, no vesicles 6. Phenocrysts: Fsp 10%, relatively fresh, 2-5 mm. Mafic minerals 2%, not larger than 1 mm. 7. Matrix: see sample -1 9. Encrustations: thin Fe-Mn coating 10. Comment: sample relatively fresh but very small	x							
SO249-DR16-3	1. Rock Type: volcanic, relatively fresh but more altered than sample -1. 2. Size: 11x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, some altered parts are slightly brownish 5. Texture / Vesicularity: porphyric, dense, no vesicles 6. Phenocrysts: Fsp 10%, 2-5 mm, slightly more altered than sample -2. Mafic minerals, 1-3 mm, 2% 7. Matrix: see sample -1 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to sample -1	x	x				MSC_GW	TS+GC to GW by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR16-4	1. Rock Type: volcanic, relatively fresh 2. Size: 7x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, small brownish alteration rim (about 5mm) 5. Texture / Vesicularity: porphyric, dense, no vesicles 6. Phenocrysts: Fsp 5%, 2-5 mm, relatively fresh. Mafic minerals 2%, 1-2 mm. 7. Matrix: see sample -1 9. Encrustations: see sample -1 10. Comment: similar to sample -1, too small for GC slab	x							
SO249-DR16-5	1. Rock Type: volcanic, rel. fresh 2. Size: 8x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: med. grey, alteration rim brownish (2-5 mm) 5. Texture / Vesicularity: porphyric, dense, no vesicles 6. Phenocrysts: Fsp. 5%, 1-4 mm, rel. fresh. Mafic minerals, 3%, 1-3 mm. 7. Matrix: dense, fine grained 9. Encrustations: thin Mn-coating 10. Comment: similar to sample -1	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR16-6	1. Rock Type: volcanic, rel. fresh 2. Size: 10x7x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, brownish alteration rim (2-4 mm) 5. Texture / Vesicularity: see sample -1 6. Phenocrysts: Fsp 10-15%, 2-7 mm. Mafic minerals 3%, 1-3 mm. 7. Matrix: see sample -1 10. Comment: similar to sample-1, too small for GC	x					MSC_GW	TS by Airfreight, GC taken out	
SO249-DR16-7	1. Rock Type: volcaniclastic or sedimentary, fairly fresh 2. Size: 47x29x15 cm from large block 3. Shape / Angularity: angular 4. Color of cut surface: green-olive 5. Texture / Vesicularity: dense, mm-sized rounded clasts floating in greenish fine-grained matrix 6. Phenocrysts: possibly Fsp and Qtz in places. Most particles are rock fragments that are sometimes vesicular. 7. Matrix: medium grained 10. Comment: unclear if sedimentary (debris flow) or welded tuff. If welded tuff, it may contain datable zircons.	2x (1 SAS)							
SO249-DR16-8	1. Rock Type: volcaniclastic or sediment, similar to sample (-11) but with strange alignment of minerals? and fragments 2. Size: 9x6x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish with white patches 5. Texture / Vesicularity: dense, particles are elongated and curved thus seem to be deformed when they were soft 6. Phenocrysts: Qtz-like matrix around dark components 7. Matrix: medium grained 10. Comment: At first sight texture looks like a deformed plutonic rock but black elongated few mm thick particles indicate that they could be deformed pumice clasts in a tuff	2x (1 SAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR16-9	1. Rock Type: clastic rock, unclear if volcanic or sedimentary 2. Size: 20x12x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: dense 6. Phenocrysts: clasts 1 cm to several mm in ø. Clasts are rounded to subangular. Most clasts have greenish coloration, a few are dark brown to black. All appear slightly elongated. 7. Matrix: Coarse grained	2x (1 SAS)							
SO249-DR16-10	1. Rock Type: plutonic? Looks similar to -8 and 9- but texture somewhat resembles a plutonic rock 2. Size: 15x14x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: dense 6. Phenocrysts: Qtz, Fsp, dark minerals 7. Matrix: medium grained 10. Comment: macroscopically difficult to decide if plutonic or volcaniclastic	x (SAS)							
SO249-DR16-11	1. Rock Type: volcaniclastic (tuff) 2. Size: 15x14x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish 5. Texture / Vesicularity: medium grained, dense, well-rounded clasts 6. Phenocrysts: Fsp, Qtz, black mineral 7. Matrix: green fine grained ash (?) 8. Secondary Minerals: yellowish alteration mineral	2x (1 SAS)							
SO249-DR16-12	1. Rock Type: volcaniclastic (tuff) 2. Size: 17x17x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish 5. Texture / Vesicularity: medium to coarse grained, clasts are subangular to rounded 6. Phenocrysts: Fsp, Qtz, clasts, black mineral 7. Matrix: green fine grained ash (?)	2x (1 SAS)							
SO249-DR16-13	1. Rock Type: volcaniclastic (tuff) 2. Size: 32x23x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish 5. Texture / Vesicularity: medium to coarse grained, subrounded and rounded clasts 6. Phenocrysts: same as -12 7. Matrix: greenish fine grained ash (?)	2x (1SAS)							
SO249-DR16-14	1. Rock Type: volcaniclastic (tuff) 2. Size: 13x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish 5. Texture / Vesicularity: fine to medium grained, subrounded clasts 6. Phenocrysts: same as -12 and -13 as well as red mineral that may be alteration 7. Matrix: greenish fine grained ash (?)	2x (SAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR16-15	1. Rock Type: volcaniclastic 2. Size: 13x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish 5. Texture / Vesicularity: fine to medium grained 6. Phenocrysts:same as -12 and -13 7. Matrix: greenish fine grained ash (?)	2x (1SAS)							
SO249-DR16-16	1. Rock Type: graded sediment 2. Size: 30x24x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: gradiation mud-silt-sand (some fine and medium), mostly well sorted mud clasts. Some elongated clasts.	2x (1 SAS)							
SO249-DR16-17	1. Rock Type: graded sediment, graded sandstone 2. Size: 18x10x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: gradiation fine and medium sand and maybe silt, less mud clasts than -16, sorted.	x							
SO249-DR16-18	1. Rock Type: siltstone (with some mud and one mud layer) 2. Size: 16x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sorted	x							
SO249-DR16-19	1. Rock Type: layered sediment (sandstone?) 2. Size: 10x6x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish green 5. Texture / Vesicularity: layers of greyish gren fine-med sand and fine sand/silt whitish grains								
SO249-DR16-7X	rest of sample SO249-DR16-7								
SO249-DR16-14X	rest of sample SO249-DR16-14X								
SO249-DR16-20X	similar to samples -1 through -6								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR16-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR17

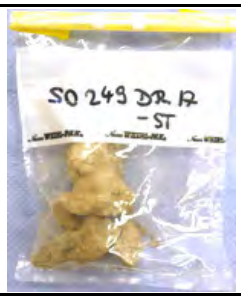
Seamount on Pacific crust E of Rat FZ

Dredge on bottom UTC 13/06/16 14:04hrs, lat 49°30.62'N, long 179°22.36'E, depth 4650 m

Dredge off bottom UTC 13/06/16 16:52hrs, lat 49°30.92'N, long 179°22.88'E, depth 4309 m

total volume: empty

Comments:

SO249-DR17-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR18

Small seamount east of Rat Fracture Zone, NE-slope of seamount

Dredge on bottom UTC 13/06/16 23:31hrs, lat 49°32.47'N, long 178°29.98'E, depth 4312 m

Dredge off bottom UTC 14/06/16 00:55hrs, lat 49°32.81'N, long 178°30.39'E, depth 3893 m

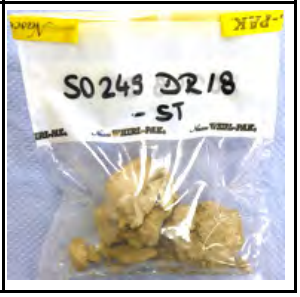
total volume: few rocks

Comments: very heterolithological dredge with intrusive, metamorphic and sedimentary rocks. All rocks are dissimilar indicating a dropstone origin. Only poorly sorted breccia (-5) with intermediate to mafic volcanic clasts could be of local origin

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR18-1	1. Rock Type: intrusive (diorite?), fresh, likely a dropstone 2. Size: 12x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey, medium 5. Texture / Vesicularity: coarse grained (crystallized), no vesicles 7. Matrix: coarse grained, 1-2 mm; Plg: 1-2 mm, fresh; Mica: <1 mm, relativley fresh; Amph?: 1 mm 9. Encrustations: thin Mn-Fe-coating	2x (1x SAS)	x						
SO249-DR18-2	1. Rock Type: intrusive, fresh, likely a dropstone 2. Size: 14x10x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-brown 5. Texture / Vesicularity: coarse grained, no vesicles 6. Phenocrysts: fully crystallized: Plg, Fsp, Bt, Amp?; felsic/mafic=50/50 8. Secondary Minerals: minor oxidation 9. Encrustations: thin Mn-film on surface 10. Comment: a dropstone origin appears likely	2x (1x SAS)	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR18-3	1. Rock Type: metasediment (Quarzite?), likely a dropstone 2. Size: 14x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: coarse, no vesicles but some Qtz veins 6. Phenocrysts: crystallized 7. Matrix: contains fragments of mafic and intermediate rocks, 3-6 mm. Also contains rounded, up to 1 cm fragments of argillites? 8. Secondary Minerals: minor oxidation 9. Encrustations: thin Mn-coating 10. Comment: fresh Plg, Ar/Ar possible but rock may not be local	2x (1x SAS)							
SO249-DR18-4	1. Rock Type: intrusive (diorite/granodiorite) 2. Size: 12x7x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: very coarse, 2-4 mm; no vesicles 6. Phenocrysts: fully crystallized 10. Comment: likely a dropstone?	2x (1x SAS)							
SO249-DR18-5	1. Rock Type: volcanic breccia? 2. Size: 10x10x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey/black 5. Texture / Vesicularity: poorly sorted: very fine matrix, 1-3 mm, vesicles in some clasts 6. Phenocrysts: subrounded to angular clasts 7. Matrix: very fine matrix 8. Secondary Minerals: none 9. Encrustations: thin Mn-Fe-coating 10. Comment: clasts are intermediate to mafic volcanic material, some have vesicles.	2x (1x SAS)							
SO249-DR18-6	1. Rock Type: metamorphic, amphibolite, dropstone 2. Size: 14x9x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine grained, massive 7. Matrix: fine grained; Chl, Plg, Actinolite? 8. Secondary Minerals: 1 mm, Qtz veins cutting through 9. Encrustations: very thin Fe-Mn coating	2x (1x SAS)							
SO249-DR18-7	1. Rock Type: sandstone 2. Size: 12x8x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark olive, green-brown 5. Texture / Vesicularity: fine-medium sand 7. Matrix: fine-medium sand, sorted. Qtz 20% mafic mineral grains on Mn-grains, Fe-oxides 9. Encrustations: thin Fe-Mn-coating	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR18-8	1. Rock Type: metamorphic (meta-igneous) 2. Size: 9x7x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: white and black specs 5. Texture / Vesicularity: fine-medium, massive 6. Phenocrysts: Amph, Bt 7. Matrix: same composition of phenocrysts 9. Encrustations: thin Mn-Fe crust 10. Comment: perhaps after leucogranite, must examine TS	2x (1x SAS)							
SO249-DR18-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR19

Very small seamount east of Rat Fracture Zone. Seamount is assymetrically elongated along E-W and located S of the larger DR18 seamount. Dredge carried out along the northern slope from base to mid section.

Dredge on bottom UTC 14/06/16 05:31hrs, lat 49°28.80'N, long 178°31.55'E, depth 4802 m

Dredge off bottom UTC 14/06/16 06:49hrs, lat 49°28.34'N, long 178°31.52'E, depth 4479 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR19-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR20

Rat Fracture Zone. Easternmost side along a ENE-WSW striking ridge. Northward dipping slope upper section.

Dredge on bottom UTC 14/06/16 15:44hrs, lat 48°58.62'N, long 177°47.30'E, depth 5265 m

Dredge off bottom UTC 14/06/16 18:41hrs, lat 48°58.40'N, long 177°47.41'E, depth 5057 m

total volume: few rocks

Comments: Mn-nodule

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR20-1	1. Rock Type: Mn-Fe nodule 2. Size: 9x7x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: brownish								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR20-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR21

Rat Fracture Zone. Northern slope of a E-W striking ridge. Feature looks like V-shaped ridge opened to W, othogonal to the Rat FZ.

Dredge on bottom UTC 14/06/16 23:20hrs, lat 49°00.84'N, long 177°59.20'E, depth 5230 m

Dredge off bottom UTC 15/06/16 01:20hrs, lat 49°00.65'N, long 177°59.32'E, depth 4946 m

total volume: few rocks

Comments: Several angular fragments of rocks of different lithology: strongly altered basalt?, mafic and silicous? Tuffs, layered sandstone/shale. Not clear if the heterogeneous lithologies reflect erosion of insitu rocks or dropstone origin. Sample -1 (altered lava) is the only true igneous rocks that is potentially insitu. Sample -4 (fresh diorite) is likely a dropstone as is clearly the case for -6 (fresh basalt).

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR21-1	1. Rock Type: volcanic, stronly altered basalt (?) 2. Size: 15x11x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, massive, no vesicles 6. Phenocrysts: red dots, (probably altered Ol), 7-15%, 1-3 mm 7. Matrix: very fine 9. Encrustations: thin Mn coating 10. Comment: some phenocrysts may be altered Plg	2x (1x SAS)	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR21-2	1. Rock Type: volcaniclastic, badly altered 2. Size: 18x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey, green 5. Texture / Vesicularity: porphyric, 1-3% vesicles 6. Phenocrysts: clasts of volcanic material, 20-25%, subrounded, vesicular, 1-10 mm 7. Matrix: very fine 8. Secondary Minerals: Chl 9. Encrustations: Mn-crust 1-3 mm	2x (1x SAS)							
SO249-DR21-3	1. Rock Type: siliceous tuff, badly altered 2. Size: 15x7x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey, some orange 5. Texture / Vesicularity: porphyric, fine, no vesicles 6. Phenocrysts: clasts of siliceous material, 1-3 mm, 5% 7. Matrix: fine - medium grained 8. Secondary Minerals: Fe-oxidation, Chl 9. Encrustations: thin Mn crust 10. Comment: badly altered	2x (1x SAS)							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR21-4	1. Rock Type: intrusive (diorite), fresh 2. Size: 7x7x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: medium grained, massive 7. Matrix: Plg, some Px 8. Secondary Minerals: small veins of oxidized material 9. Encrustations: thin Mn-Fe coating 10. Comment: fresh Plg, good for Ar -Ar	2x (1x SAS)		x					
SO249-DR21-5	1. Rock Type: sedimentary, sandstone 2. Size: 30x11x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey brown 5. Texture / Vesicularity: laminated ca. 2-3 mm scale 7. Matrix: fine sand, some mud, Qtz, Fe-oxides 9. Encrustations: thin Mn coating	2x (1x SAS)							
SO249-DR21-6	1. Rock Type: volcanic, fresh lava (basalt) 2. Size: 13x7x4 cm 3. Shape / Angularity: well rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine, massive, 1-3%, tiny vesicles 7. Matrix: fine Plg, Px?, < 1% altered Ol 8. Secondary Minerals: some fine veining sulfides in vesicles? 9. Encrustations: thin Mn coating 10. Comment: probably dropstone	x							
SO249-DR21-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR22

Rat Fracture Zone. E-W striking ridge S of DR20 & DR21. N facing slope, slightly oblique track due to wind directions

Dredge on bottom UTC 15/06/16 07:23hrs, lat 48°43.00'N, long 178°6.17'E, depth 5695 m

Dredge off bottom UTC 15/06/16 08:37hrs, lat 48°42.64'N, long 178°6.06'E, depth 5205 m

total volume: few rocks

Comments: Plg ± altered Ol phyric lava fragments dominate and vary by degree of groundmass alteration (-1 to -8). Sample -1 is the largest and freshest. Sample -9A and -9B are lava clasts recovered from a larger Mn crust. They are also Plg ± altered Ol phyric but in addition contain traces of presumably Px phenocrysts. -10 and -11 represents more latered varieties of the previously mentioned lithologies. Overall the dredge recovered insitu Plg (±Ol ±Px) phyric lava from the incoming Pacific plate. The Plg should be checked for feshness and its potential for Ar-Ar dating.

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR22-1	1. Rock Type: volcanic 2. Size: 16x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2mm), altered Ol? (3%, 2mm) 7. Matrix: dense 8. Secondary Minerals: red alteration along cracks + alteration halo 10. Comment: samples 1-8 are all Plg phyric volcanic rocks, which show an inceasing degree of alteration with -8 being the most altered	x	x	x?			MSC_SK	TS+GC by Airfreight	
SO249-DR22-2	1. Rock Type: volcanic 2. Size: 11x10x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (7%, 3mm, altered Ol? (1%, 3mm) 7. Matrix: dense 8. Secondary Minerals: red alteration along cracks	x		x?					
SO249-DR22-3	1. Rock Type: volcanic 2. Size: 10x8x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 2mm), altered Ol? (1%, 1mm) 7. Matrix: dense 8. Secondary Minerals: red alteration along cracks and alteration halo								
SO249-DR22-4	1. Rock Type: volcanic 2. Size: 11x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porhyritic 6. Phenocrysts: Plg (10%, 3mm), altered Ol? (3%, 1mm) 7. Matrix: dense 8. Secondary Minerals: red alteration halo	x		x?					
SO249-DR22-5	1. Rock Type: volcanic 2. Size: 8x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 3mm), altered Ol? (2%, 1mm) 7. Matrix: dense 8. Secondary Minerals: red alteration halo								
SO249-DR22-6	1. Rock Type: volcanic 2. Size: 10x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 3mm), altered Ol? (1%, 1mm) 7. Matrix: dense 8. Secondary Minerals: red alteration along crack and alteration halo	x		x?					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR22-7	1. Rock Type: volcanic, highly altered 2. Size: 10x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey + red 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2mm)								
SO249-DR22-8	1. Rock Type: volcanic 2. Size: 13x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2mm), altered Ol? (2%, 2mm) 7. Matrix: fine grained, Plg + Px 8. Secondary Minerals: red alteration along cracks + alteration halo 9. Encrustations: 2-5mm thick Mn crust	x							
SO249-DR22-9A	1. Rock Type: volcanic 2. Size: 8x8x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: altered orange mineral Ol? (1%, 1mm), Plg (1%, 1mm), black mineral (1%, 1mm) 7. Matrix: fne grained 9. Encrustations: Mn crust 10. Comment: this rock and -9B were included in bloc F (32x16x15 cm) which was mostly Mn crust	x							
SO249-DR22-9B	1. Rock Type: volcanic 2. Size: 8x8x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey + red brown 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (3-5%, 1mm), Ol (3mm), black mineral (2%, 1mm) 7. Matrix: fine grained with red alteration 9. Encrustations: Mn crust 10. Comment: this rock was included in bloc F (32x16x15 cm) which was mostly Mn crust	x							
SO249-DR22-10	1. Rock Type: volcanic 2. Size: 8x7x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: reddish brown + grey 5. Texture / Vesicularity: porpyritic 6. Phenocrysts: Plg (3%, 1mm), yellowish altered mineral (<1%, 1mm), red altered mineral (<1%, 1mm) 7. Matrix: fine grained with red alteration								
SO249-DR22-11	1. Rock Type: volcanic 2. Size: 7x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish brown 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, <1mm), altered orange mineral Ol? (2%, 1mm) 7. Matrix: dense 9. Encrustations: Mn crust								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR22-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR23

Rat Fracture Zone. E-W striking ridge west of easternmost N-S striking valley. North dipping slope from bottom to top

Dredge on bottom UTC 15/06/16 07:23hrs, lat 48°44.29'N, long 177°30.24'E, depth 5088 m

Dredge off bottom UTC 15/06/16 08:37hrs, lat 48°43.88'N, long 177°30.10'E, depth 4510 m

total volume: few rocks

Comments: Variable volcaniclastic rocks. Sample -1 and -2 are fairly fresh breccias or welded tuffs that contain mm-sized, subangular clasts of Plg phyric basalt. Their freshness and thin Mn coating questions insitu origin. Sample -3 and in particular -4 are insitu as they are more thoroughly altered or are part of a thick Mn crust. Preference should be given to Ol basalt fragments within breccia -4.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR23-1	1. Rock Type: volcaniclastic breccia / welded tuff? 2. Size: 22x18x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: blueish grey 5. Texture / Vesicularity: medium-coarse, massive 6. Phenocrysts: larger clasts of Plg phyric basalt, 5-10mm, subangular. Also approx. 2-3mm Px, 7-10% 7. Matrix: medium, 1-2mm. Plg + Px 8. Secondary Minerals: few veins filled with zeolite? 9. Encrustations: thin Mn-Fe coating 10. Comment: fairly fresh Px	x x(SAS)							
SO249-DR23-2	1. Rock Type: volcaniclastic (altered tuff?) 2. Size: 11x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-green 5. Texture / Vesicularity: Medium to coarse grained, approx. 3% vesicles 6. Phenocrysts: mafic clasts, 1-3 mm, approx. 5%. Plg, approx. 1 mm, 3% 7. Matrix: Med.-grain, Plg+Px? 8. Secondary Minerals: Chl? Possibly zeolite in vesicles 9. Encrustations: thin Fe-Mn coating	x x(SAS)							
SO249-DR23-3	1. Rock Type: volcanclastic breccia 2. Size: 14x10x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark brown-grey 5. Texture / Vesicularity: fine-coarse, poorly sorted, approx. 1% vesicles? 6. Phenocrysts: clasts of intermediate to mafic volcanic material, rounded to subangular, 0.5-15 mm. Approx. 2-3% reddish fragments, approx. 0.5-1 mm (altered Ol?) 7. Matrix: Fine, dark brownish material 8. Secondary Minerals: zeolite in some vesicles, some Plg altered to chlorite 9. Encrustations: thin Fe-Mn coating 10. Comment: altered	x x(SAS)							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR23-4	1. Rock Type: volcaniclastic breccia with Ol-basalt fragments 2. Size: 11x9x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: orange-tan-grey 5. Texture / Vesicularity: Very fine to very coarse 6. Phenocrysts: weathered Ol-basalt fragments, 5-20 mm, 40%, subangular to subrounded 7. Matrix: very fine sand + mud 8. Secondary Minerals: Mn-oxides, Fe-oxides 9. Encrustations: thick Mn crust	x							
SO249-DR23-5-Mn	1. Rock Type: Mn crust 2. Size: 15x12x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brown-black 5. Texture / Vesicularity: massive 10. Comment: thick Mn crust with some muddy matrix from sample -4 attached								
SO249-DR23-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR24

Rat Fracture Zone: W facing slope, lower part of small canyon. Profile oblique to slope

Dredge on bottom UTC 16/06/16 03:42hrs, lat 49°57.22'N, long 177°40.16'E, depth 5419 m

Dredge off bottom UTC 16/06/16 04:56hrs, lat 49°56.78'N, long 177°40.25'E, depth 5130 m

total volume: 1/6 full, several 10th of cm sized rocks

Comments: Aphyric lava fragments angular to subrounded, subangular coarse grained lava with altered Ol and Px along with several Mn-crusts. Vesicular basalt with filled vesicles, rounded granites are most likely dropstones. Two types of lava, aphyric (-1 to -5) and coarse grained (-6 to -9) with Plg and Px or Amph microphenocrysts are probably in situ. In the porphyric group contains black phenocrysts that are described as Amph or Px and thin section must be checked as Amph would indicate an arc related origin and thus dropstone. Vesicular lava and granite are both strongly rounded and probably dropstones. Initial priority should be given to the aphyric lava fragments (-1 to -5)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR24-1	1. Rock Type: volcanic (basalt) 2. Size: 26x15x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 6. Phenocrysts: none 7. Matrix: dense, Plg, Px 8. Secondary Minerals: alteration halo (approx. 1 cm) 9. Encrustations: none 10. Comment: Samples -1 to -5 are a group of aphyric volcanic rocks	x (SAS)	x				MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR24-2	1. Rock Type: volcanic (basalt) 2. Size: 27x17x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 6. Phenocrysts: none 7. Matrix: dense, Plg + Px	x (SAS)	x						
SO249-DR24-3	1. Rock Type: Volcanic (basalt) 2. Size: 14x12x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense, Plg+Px	x (SAS)	x						
SO249-DR24-4	1. Rock Type: volcanic 2. Size: 7x5x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense, Plg 8. Secondary Minerals: white veins 9. Encrustations: some Mn crust (approx. 3 mm)	x (SAS)							
SO249-DR24-5	1. Rock Type: volcanic 2. Size: 10x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphanytic 7. Matrix: dense, Plg + Px 8. Secondary Minerals: alteration halo (approx. 1 cm)	x (SAS)							
SO249-DR24-6	1. Rock Type: volcanic 2. Size: 14x10x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Fsp (1%, 2 mm) 7. Matrix: dense 8. Secondary Minerals: white veins and veins of "yellowish-gold" minerals (sulfides?)	x (SAS)							
SO249-DR24-7	1. Rock Type: volcanic 2. Size: 19x16x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (15%, 2mm), black prismatic mineral (7%, 2 mm), yellow altered mineral (7%, 2 mm) 7. Matrix: dense 9. Encrustations: Mn crust (approx. 2 mm)	x (SAS)					MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR24-8	1. Rock Type: volcanic 2. Size: 16x11x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: black minerals (2%, 1mm), altered Amph? / Px? (10%, 2mm) 7. Matrix: dense 9. Encrustations: Mn crust ca. 5mm	x (SAS)	x						
SO249-DR24-9	1. Rock Type: volcanic 2. Size: 9x8x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Amph (7%, 3mm), Plg (3%, 2mm) 7. Matrix: dense 8. Secondary Minerals: alteration halo (ca. 1cm), some Amph is altered 9. Encrustations: Mn crust (ca. 4mm)	x (SAS)							
SO249-DR24-10	1. Rock Type: volcanic 2. Size: 21x16x12 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular (5%) 6. Phenocrysts: Plg (7%, 3mm), black minerals (2%, 2mm) 7. Matrix: fine grained 8. Secondary Minerals: some Plg is altered	x (SAS)							
SO249-DR24-11	1. Rock Type: breccia 2. Size: 12x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish brown + black 5. Texture / Vesicularity: poorly sorted clasts 8. Secondary Minerals: Mn layers within breccia								
SO249-DR24-12	1. Rock Type: plutonic 2. Size: 27x17x13 cm 3. Shape / Angularity: rounded 4. Color of cut surface: black and white 5. Texture / Vesicularity: holocystalline 6. Phenocrysts: Fsp, 2-5mm, 30%; Qtz, 3-4mm, 35%, Bt, 1-4mm, 30%, Px, 1mm, 5% 9. Encrustations: thin Mn-Fe coating 10. Comment: strongly rounded and plutonic, indicating dropstone origin								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR24-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR25

Murray Canyon; Eastern Canyon wall; 3km W of WAVE DR30 (47Ma) site but lowermost section of slope

Dredge on bottom UTC 16/06/16 16:41hrs, lat 51°41.47'N, long 176°45.40'E, depth 3540 m

Dredge off bottom UTC 16/06/16 18:07hrs, lat 51°41.07'N, long 176°45.17'E, depth 3171 m

total volume: 1/4 full

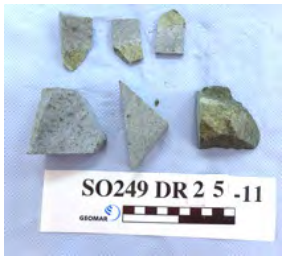
Comments: Variably crystallized igneous rocks (lavas, dolerites, micro gabbro). They can represent different parts of a thick lava flow as mineralogy appears the same for all. Priority: all are good for geochemistry and possibly Ar-Ar dating (Plg and groundmass). Sample -13 is doleritic

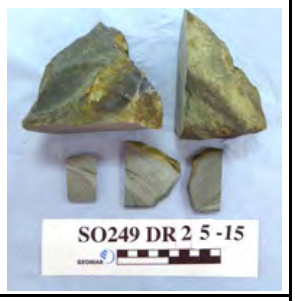
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR25-1	1. Rock Type: volcanic, fresh 2. Size: 10x17x15 cm part of block E (31x30x18 cm) 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, 5-7% vesicles 6. Phenocrysts: Plg, 10%, 1mm; Px, 7%, 1mm; Amph (green) 5%, 1mm 7. Matrix: fine grained 9. Encrustations: partly coated with Fe-Mn 10. Comment: maybe good for age dating	x	x	1-2; plag			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR25-2	1. Rock Type: volcanic, fresh 2. Size: 23x14x9 cm (part of block W) 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, ~5% vesicles 6. Phenocrysts: Plg, 10%, ~1mm; Px, 1mm, 5%; Amph, 2-5%, mica 4%, 1-2mm 7. Matrix: fine grained with phenocrysts 8. Secondary Minerals: green mineral in vesicles as needles 9. Encrustations: partly covered with Fe-Mn crust	3x; (1xSPG)		1-2; plag					
SO249-DR25-3	1. Rock Type: volcanic, fresh 2. Size: 13x11x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, ~10-12% vesicles 6. Phenocrysts: Plg, ~2mm, 15%; Px, ~1mm, 5%; Amph?, ~1mm, 3% 7. Matrix: fine grained with phenocrysts 8. Secondary Minerals: veins, filled with white-grey mineral, cc 9. Encrustations: no crust 10. Comment: loads of Plg, maybe good for Ar-Ar dating	x	x	1-2; plag			MSC_GW	TS+GC to GW by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR25-4	1. Rock Type: volcanic, partly altered 2. Size: 16x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, ~5-7% vesicles 6. Phenocrysts: Plg, ~2mm, 10-12%; Px, ~1mm, 4%; Amph, ~1mm, 3% 7. Matrix: fine grained with phenocrysts 8. Secondary Minerals: rim around center, slightly altered, orange patches could be Ol (iddingsite) 10. Comment: good Plg, maybe good for Ar-Ar dating	x	x	1-2; plag					
SO249-DR25-5	1. Rock Type: volcanic, fresh 2. Size: 17x11x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, 5% vesicles partly filled 6. Phenocrysts: Plg fresh, 1-2mm, 10%; Px somewhat fresh, ~1mm, 10% 7. Matrix: fine grained 8. Secondary Minerals: zeolites, possible Amph in vesicles 10. Comment: careful preparation (vesicles!) otherwise good for geochemistry, Ar-Ar?	x	x	1-2; plag			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR25-6	1. Rock Type: volcanic, somewhat fresh 2. Size: 4x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, ~3% filled vesicles 6. Phenocrysts: similar to -5 but Px is 1-4mm 7. Matrix: fine grained 8. Secondary Minerals: same as in -5, maybe Chl in vesicles	x	x						
SO249-DR25-7	1. Rock Type: volcanic somewhat fresh 2. Size: 27x13x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, ~3-5% partly filled vesicles 6. Phenocrysts: Px, somewhat fresh, 1-3mm, ~7%; Amph?, fresh, ~1mm, 3-5%; Plg, fresh, 1mm, 1-3% 7. Matrix: fine-medium grained, Plg-Px phenocrysts 8. Secondary Minerals: Qtz + Fe oxide in vesicles 9. Encrustations: thin Mn-Fe coating	x	x	2					
SO249-DR25-8	1. Rock Type: volcanic fresh 2. Size: 15x13x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to dark-grey 5. Texture / Vesicularity: porphyritc, massive 6. Phenocrysts: Px, fresh, 10-12%, 1-4mm, Amph?, fresh, 1-3%, ~1mm 7. Matrix: fine to medium grained, Plg-Px phenocrysts 9. Encrustations: thin Mn-fe coating 10. Comment: good for geochemistry, possible Ar-Ar dating	x	x	1-2			MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR25-9	1. Rock Type: igneous, fresh 2. Size: 16x12x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: massive; resembles diabase 6. Phenocrysts: none 7. Matrix: medium grained, Plg, Px and Amph? 8. Secondary Minerals: possible Fe-oxides, pyrite 9. Encrustations: none 10. Comment: fresh Plg for Ar-Ar dating, geochemistry	3x (1x SAS)	x	1-2			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR25-10	1. Rock Type: fresh igneous 2. Size: 15x13x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: massive, medium grained, no vesicles 6. Phenocrysts: none observed 7. Matrix: medium grained, Plg, Px 8. Secondary Minerals: none 10. Comment: fresh Plg good for Ar-Ar dating, whole rock good for geochemistry. Two Px types; 1-2mm greenish, ~1mm black	x	x	1-2			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR25-11	1. Rock Type: volcanic, fresh with light inclusions in dark rock 2. Size: 12x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium greenish-grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Px, 15-20%, 3-4mm, fairly fresh 7. Matrix: medium grained, Px, Plg 10. Comment: attached section of lighter greenish Amph bearing felsic rock. Contact between sections is not sharp	2x (1xSAS)	x	1-2					
SO249-DR25-12	1. Rock Type: volcanic fresh 2. Size: 17x16x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to light grey 5. Texture / Vesicularity: medium grained doleritic 6. Phenocrysts: Plg, 50%, 1-2mm, fresh 7. Matrix: fine grained 8. Secondary Minerals: sulfides in veins 10. Comment: fresh Plg for Ar-Ar dating	2x (1xSAS)	x	1-2			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR25-13	1. Rock Type: volcanic slightly altered 2. Size: 16x9x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: medium fine grained, doleritic? 7. Matrix: medium fine grained, Plg, Px, Amph 8. Secondary Minerals: Qtz in veins, sulfide (pyrite?) 10. Comment: Plg appears altered, sulfides appear secondary	x	x	2-3					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR25-14	1. Rock Type: sediment, mudstone + sandstone 2. Size: 19x9x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: tan (mud), light grey (sandstone) 5. Texture / Vesicularity: massive (sandstone), thinly laminated (mud) 7. Matrix: sandstone fine to very coarse, poorly sorted 10. Comment: mudstone appears insected into volcaniclastic? sandstone	2x (1xSAS)							
SO249-DR25-15	1. Rock Type: sediment, mudstone 2. Size: 20x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: thinly laminated, cross laminated 10. Comment: sharp bedding contact								
SO249-DR25-16	1. Rock Type: sedimentary, mudstone 2. Size: 15x10x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium greyish brown 5. Texture / Vesicularity: thin wavy lamination 10. Comment: rare, greenish silty laminae								
SO249-DR25-17	1. Rock Type: sediment, mudstone 2. Size: 12x12x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greyish brown 5. Texture / Vesicularity: thin wavy lamination 8. Secondary Minerals: Qtz vein fill								
SO249-DR25-18	1. Rock Type: sediment, sandstone 2. Size: 12x12x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brownish grey 5. Texture / Vesicularity: massive 7. Matrix: fine to coarse grained sand 10. Comment: grains predominantly lithic fragments								
SO249-DR25-19	1. Rock Type: igneous, fresh 2. Size: 12x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: massive, medium grained 7. Matrix: medium grained, Plg, Px: 10. Comment: microgabbro? Plg for Ar-Ar dating	missing TS		1-2					
SO249-DR25-20X	piece from block E; corresponds to sample -1								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR25-21X	piece of block W; corresponding to sample -2								
SO249-DR25-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR26

Murray Canyon: NW slope in the lower part of the canyon along a realtively steep slope

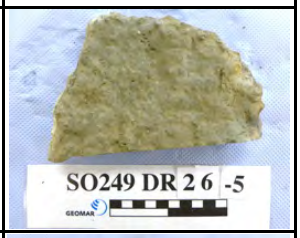
Dredge on bottom UTC 16/06/16 23:44hrs, lat 51°30.67'N, long 176°06.64'E, depth 4445 m

Dredge off bottom UTC 17/06/16 01:15hrs, lat 51°31.10'N, long 176°06.50'E, depth 4067 m

total volume: 1/4 full

Comments: One large fragment of igneous rock (basalt?) and mostly variably solidified deepwater sediments. Some sediments are hydrothermally reworked and insitu breccias cemented by opal(?). Priority: -1 most likely insitu rock, pretty fresh, -7 pebble of Plg-Px basalt, -8 Ol basalt, fresh, 15-20% Ol

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR26-1	1. Rock Type: Plg phyric basalt 2. Size: 21x11x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, no vesicles 6. Phenocrysts: Plg, 5mm, ~5%; Px <3mm, 3% often together with Plg 7. Matrix: fine grained 8. Secondary Minerals: slightly altered, Chl? 9. Encrustations: thin Fe-Mn coating 10. Comment: very good for geochemistry and Ar-Ar dating. Avoid veins and encrustations	x	x	1-2			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR26-2	1. Rock Type: metamorphic rock, Amph (Hbl) shist 2. Size: 15x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: foliated 7. Matrix: Amph, Px, Qtz; fine grained 8. Secondary Minerals: chlorite, small veins filled with Qtz 10. Comment: good for estimation of metamorphic conditions	x (x_SAS)							
SO249-DR26-3	1. Rock Type: sedimentary rock 2. Size: 18x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine grained 7. Matrix: fine grained 9. Encrustations: some veins filled with Qtz								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR26-4	1. Rock Type: sedimentary rock, clay 2. Size: 24x12x23 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to greenish 5. Texture / Vesicularity: massive 9. Encrustations: cracks filled with oxidations								
SO249-DR26-5	1. Rock Type: sedimentary breccia. clasts = clay stone?, sand stone. Cracks filled with opal 2. Size: 32x16x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to greenish / brownish 5. Texture / Vesicularity: massive 9. Encrustations: covered with thin layer of clay								
SO249-DR26-6	1. Rock Type: mudstone + layers of sandstone 2. Size: 15x12x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish-brownish 5. Texture / Vesicularity: masssive 10. Comment: veins filled with opal, lots of worm prints								
SO249-DR26-7	1. Rock Type: volcanic rock 2. Size: 16x10x6 cm 3. Shape / Angularity: rounded (pebble) 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg 10%, Px 10% 7. Matrix: fine grained 8. Secondary Minerals: Chl 10. Comment: covered by oxidation. Pebble shape indicates beach or fluvial environment and thus the rock is most likely not insitu. It was either transported from further up or transported by ice.	1x (1xSAS)							
SO249-DR26-8	1. Rock Type: volcanic rock 2. Size: 11x7x3 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: medium grained, porphyritic, vesicles 5% filled with blue material (clay?) 6. Phenocrysts: ol 20%, Plg (?) 7. Matrix: fine grained 8. Secondary Minerals: slightly altered 9. Encrustations: thin oxidation 10. Comment: vesicles filled with clay (?) and sulfides (?)	x					MSC_GW	TS+GC to GW by Airfreight	
SO249-DR26-9	1. Rock Type: meta-sedimentary rock 2. Size: 9x7x2 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey greenish 5. Texture / Vesicularity: massive fine grained 8. Secondary Minerals: thin oxidations 10. Comment: small fragments of sedimentary layer								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR26-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR27

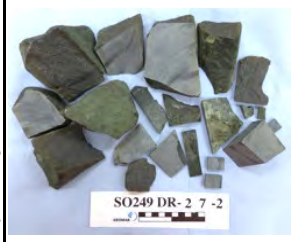
Murray Canyon: NW slope in the lower part of the canyon

Dredge on bottom UTC 17/06/16 05:31hrs, lat 51°37.00'N, long 176°24.00'E, depth 4089 m

Dredge off bottom UTC 17/06/16 07:15hrs, lat 51°38.09'N, long 176°24.34'E, depth 3683 m

total volume: few rocks

Comments: Ol-Px-Plg phyric lavas make up most of DR27. Sample -1 contains abundant CPx, Plg, and Amph; -2 = freshest sample and contains fresh Ol!

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR27-1	1. Rock Type: volcanic 2. Size: 27x20x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, small vesicles (3%) filled with light blue mineral (3%, 1mm) 6. Phenocrysts: CPx (10%, 3mm), Plg (7%, 2mm), Hbl (10%, 2mm) 7. Matrix: mostly dense 8. Secondary Minerals: alteration halo ~1cm	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR27-2	1. Rock Type: volcanic 2. Size: 24x21x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Ol (3%, 2 mm); Px (3%, 2 mm); Plg (5%, 1 mm) 7. Matrix: dense 8. Secondary Minerals: alteraton halo, 1 cm 10. Comment: freshest rock of the dredge, got some Ol	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR27-3	1. Rock Type: volcanic 2. Size: 13x8x4 cm 3. Shape / Angularity: sub angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 1 mm), altered mineral (5%, 1 mm) 7. Matrix: dense 8. Secondary Minerals: alteration halo								
SO249-DR27-4	1. Rock Type: volcanic 2. Size: 9x7x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 1 mm); altered orange mineral Ol? (10%, 1mm) 7. Matrix: dense								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR27-5	1. Rock Type: volcanic 2. Size: 17x15x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular 7% 6. Phenocrysts: Plg, 7%, 1 mm; altered orange mineral Ol? (7%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: alteration halo	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR27-6	1. Rock Type: volcanic, moderately altered 2. Size: 22x18x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyritic, vesicles 20% 6. Phenocrysts: Plg (2%, 1mm), altered orange mineral Ol? (5%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: alteration halo 1.5 cm	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR27-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR28

Murray Canyon: Eastern slope lower section below WAVE DR30

Dredge on bottom UTC 17/06/16 11:30hrs, lat 51°41.60'N, long 176°46.86'E, depth 3557 m

Dredge off bottom UTC 17/06/16 12:57hrs, lat 51°41.16'N, long 176°46.93'E, depth 2978 m

total volume: few rocks

Comments:

Few lava fragments. A single porphyric lava (sample -1) contains Plg and CPx with possible OPx to be confirmed by thin section. Majority of lava is aphyric and varies by degree of altration. Sample -2 appears freshest of this group

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR28-1	1. Rock Type: volcanic 2. Size: 38x23x13 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (3%, partially filled with white crystals) 6. Phenocrysts: Plg (10%, 3 mm), OPx (7%, 2 mm), CPx (10%, 2 mm) 7. Matrix: fine grained 8. Secondary Minerals: alteration halo (approx. 1 cm) 10. Comment: minerals are fresh. No other rocks from this dredge are similar to this rock.	x	x				MSC_GW	TS+GC to GW by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR28-2	1. Rock Type: volcanic 2. Size: 30x19x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg, Px(?) 8. Secondary Minerals: alteration halo & alteration along cracks 10. Comment: Samples -2 to -10 are a group of aphyric volcanic rocks with varying degrees of alteration	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR28-3	1. Rock Type: volcanic 2. Size: 12x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, vesicular (7%), vesicles are filled with white & red material 7. Matrix: fine grained, Plg 8. Secondary Minerals: red material that is in the vesicles is also present in cracks throughout the rock	x	x						
SO249-DR28-4	1. Rock Type: volcanic 2. Size: 17x13x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, 10% vesicles, filled w/ white & red material 7. Matrix: fine grained, Plg & Px(?) 8. Secondary Minerals: Material found in vesicles is also in cracks throughout the rock, copper colored secondary mineral with metallic luster also found in cracks (<1 mm)	x							
SO249-DR28-5	1. Rock Type: volcanic 2. Size: 8x8x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Px(?) 8. Secondary Minerals: highly fractured, most filled with white and/or red material	x							
SO249-DR28-6	1. Rock Type: volcanic 2. Size: 12x9x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg + Px(?) 8. Secondary Minerals: fractures in rock are filled with white, red, & green material	x							
SO249-DR28-7	1. Rock Type: Volcanic 2. Size: 7x5x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Px(?) + Plg 8. Secondary Minerals: alteration halo (approx. 5 mm)	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR28-8	1. Rock Type: Volcanic 2. Size: 10x4x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg + pyx(?) 8. Secondary Minerals: alteration halo (approx. 4 mm)	x							
SO249-DR28-9	1. Rock Type: volcanic 2. Size: 14x5x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Px(?) + Plg 8. Secondary Minerals: alteration halo (approx. 3 mm), fractures are filled with white & green material	x							
SO249-DR28-10	1. Rock Type: volcanic, highly altered 2. Size: 9x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained 8. Secondary Minerals: reddish brown and green patches of alteration throughout the rock	x							
SO249-DR28-11	1. Rock Type: volcanic, glassy, conchoidal 2. Size: 8x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: black 5. Texture / Vesicularity: patches of vesicular glass in dense matrix, phenocrysts too 6. Phenocrysts: Relict phenocryst = Plg? 7. Matrix: aphyric matrix 8. Secondary Minerals: Chl / serpentinite	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR28-12	1. Rock Type: volcanic, altered 2. Size: 12x10x4 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: fine, porphyritc, 1-3% vesicles 6. Phenocrysts: altered Ol?, up to 1 mm, 3-5% 7. Matrix: fine, Plag + Px ? 8. Secondary Minerals: sulfides (replacing olivine?) 10. Comment: groundmass may be fresh, possibly not in situ.								
SO249-DR28-13	1. Rock Type: volcanc, highly altered 2. Size: 13x10x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish grey, tan, black spots 5. Texture / Vesicularity: fine-medium, massive, veiny 6. Phenocrysts: - 7. Matrix: Qtz, Fsp, Amph? 8. Secondary Minerals: numerous veins of white-grey minerals (zeolithe, Chl?), Mn deposits (black spots) 9. Encrustations: thin Mn-coating								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR28-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR29

Murray Canyon: Eastern slope immediately further upslope of DR28, covering roughly similar stretch in elevation of WAVE DR30

Dredge on bottom UTC 17/06/16 15:22hrs, lat 51°41.27'N, long 176°47.30'E, depth 3894 m

Dredge off bottom UTC 17/06/16 16:52hrs, lat 51°40.85'N, long 176°47.51'E, depth 2377 m

total volume: full

Comments: Igneous rocks ranging from fully crystalline gabbro to basalts with various transitional rocks (micro-gabbro, dolerites). Subordinary types are breccia with clasts of aphyric vesicular basalts (possibly pillow fragments). Some lithified sediments of claystone and sandstone. Additional notes: Nearly all rocks from this dredge with numbers from -1 to -22 are very fresh and good for chemistry and dating. Two types recognized. Rocks of type 1 are roughly ordered from intrusive to volcanic, from fully crystalline to partly crystalline. Intrusive rocks - gabbros are -1 to 6, -8 to -11, -23; subvolcanic rocks - dolerites, microgabbro are -12 to -16; volcanic (lavas) are -17 to -22. The above listed samples are generally similar in mineralogy. Main minerals are Plg, CPx, Ol, ±Hbl. Proportions of CPx/Plg vary significantly. Plg is fresh in all rocks and good for dating. Gabbros and some dolerites/ microgabbro may contain zircon for U/Pb dating. 2nd type are aphyric vesicular basalts and volcanic breccia (volcaniclastics). The rocks are aphyric to microlithic. Some fragments may represent pillow lavas and thus erupted under water. They may repersent initial submarine stage of arc volcanism in the Aleutians or submarine volcano of later stage. Sample -7 is special because of Ol and Phlogopite phenocrysts.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-1	1. Rock Type: intrusive gabbro, very low degree of alteration 2. Size: 32x28x11 cm 3. Shape / Angularity: angular fragment from large boulder F 4. Color of cut surface: grey-greenish pale blue 5. Texture / Vesicularity: massive granoblastic, coarse grained 6. Phenocrysts: Plg (70%)+CPx+Hbl (30%) 7. Matrix: coarse grained 8. Secondary Minerals: minor Actinolite otherwise very fresh rock 10. Comment: good sample for dating: Ar-Ar; Plg + Hbl and U-Pb in zircon (if available)	x (SAS)	x	1 (plag-hbl)			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR29-2	1. Rock Type: intrusive, gabbro more mafic than -1; very low degree of alteration 2. Size: 50x27x16 cm 3. Shape / Angularity: angular fragment from big boulder W 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: massive, granoblastic 6. Phenocrysts: Plg+CPx+Mt±Hbl; 50% Plg; ~50% Px 7. Matrix: medium grained 8. Secondary Minerals: minor Actinolite otherwise very fresh rock 10. Comment: good sample for dating: Ar-Ar; Plg + Hbl and U-Pb in zircon (if available)	x (SAS)	x	1 (plag-hbl)					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-3	1. Rock Type: intrusive rock, melanocratic gabbro; low degree of alteration 2. Size: 18x11x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive, granoblastic 6. Phenocrysts: Px (25-30%) +CPx (>50%) ±Hbl +Mt (~3%), possibly Ol 7. Matrix: medium grained 8. Secondary Minerals: Actinolite; ± Chl 10. Comment: Ar-Ar on Plg ; Hbl	x (SAS)	x	1 (plag-hbl)					
SO249-DR29-4	1. Rock Type: intrusive rock, gabbro; low degree of alteration 2. Size: 22x12x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale greenish - blue grey 5. Texture / Vesicularity: massive, granoblastic 6. Phenocrysts: Plg (30-40%) + CPx (45-55%) ± Hbl + Mt, possible Ol 7. Matrix: medium grained 8. Secondary Minerals: Actinolite; altered actinolite 10. Comment: Ar-Ar in Plg, U-Pb in zircon if available	x (SAS)	x	1 (plag-hbl)					
SO249-DR29-5	1. Rock Type: intrusive rock, gabbro; low degree of alteration 2. Size: 13x11x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey pale, greenish - blue 5. Texture / Vesicularity: massive, granoblastic 6. Phenocrysts: Plg (30-40%) + CPx (>50%) ± Hbl + Mt, possibly completely altered Ol 7. Matrix: medium grained 8. Secondary Minerals: Actinolite?, Chl? 10. Comment: Ar-Ar on Plg, U-Pb in zircon if available	x	x	x					
SO249-DR29-6	1. Rock Type: intrusive rock, gabbro; very low degree of alteration 2. Size: 18x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: gray - pale blue 5. Texture / Vesicularity: massive, granoblastic 6. Phenocrysts: Plg (40%) + CPx (40-50%) ± Hbl (~10%) 7. Matrix: coarse grained 8. Secondary Minerals: Actinolite?, Chl? 10. Comment: Ar-Ar on Plg and Hbl?, U-Pb in zircon	x (SAS)	x	1 (plag-hbl)					
SO249-DR29-7	1. Rock Type: volcanic rock (ol-phlogopite-Plg basalt) 2. Size: 15x9x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey - pale blue 5. Texture / Vesicularity: massive, no vesicles 6. Phenocrysts: porhyritic; Ol (≤1.5mm, ~20%, fresh!), phlog (≤1mm, 5%), Plg (≤0.5mm, ~10-15%), Px? 7. Matrix: aphyric (cryptocrystalline) 8. Secondary Minerals: chloritization after glass + Plg 9. Encrustations: 2mm alteration halo 10. Comment: Ol fresh!, Phlogopite! (Ar-Ar) good for chemistry and Ar-Ar dating. However rounded shape suggests transport over large distances from island or by ice?	x (SAS)	x	1	x		MSC_GW	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-8	1. Rock Type: intrusive microgabbro, very fresh 2. Size: 45x44x20 cm 3. Shape / Angularity: angular fragment from bolder T 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive, gabbroic-ophitic 6. Phenocrysts: honey yellow colored mineral! OPx or ol 7. Matrix: fine grained, Plg (20-30%), CPx (40-50%), Hbl ≤7% 8. Secondary Minerals: ± Actinolite, perhaps Chl 10. Comment: Ar-Ar on Plg; U-Pb on zircon	x	x	1 plag			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR29-9	1. Rock Type: intrusive / subvolcanic rock; microgabbro or dolerite 2. Size: 40x38x29 cm, part of block X 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, slightly greenish 5. Texture / Vesicularity: massive, doleritic 7. Matrix: Plg, Px; amount 30:70 8. Secondary Minerals: minor Actinolite, Chl after Plg 10. Comment: very fresh, good for geochemistry and Ar-Ar	x	x	1 plag					
SO249-DR29-10	1. Rock Type: Intrusive, melanocratic micrograbbro 2. Size: 30x13x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey blueish 5. Texture / Vesicularity: massive granoblastic 6. Phenocrysts: altered ol (≤1mm, 10-15%), Px or Hbl (≤2mm, 60%), Plg (≤1mm, nonophitic) 8. Secondary Minerals: minor Actinolite, Chl, Ol not fresh 9. Encrustations: thin film on surface, ~5mm alteration halo 10. Comment: Ol not fresh, sample looks ok for geochemistry; Ar-Ar?	x (SAS)	x	1-2					
SO249-DR29-11	1. Rock Type: intrusive microgabbro, similar to -9 2. Size: 26x16x9 cm 3. Shape / Angularity: subangular 8. Secondary Minerals: somewhat altered, Actinolite, Chl after Hbl 10. Comment: contains leucocratic veins; ~2-3mm wide => segregations of silicic melt?	x (SAS)	2	2					
SO249-DR29-12	1. Rock Type: intrusive / subvolcanic (dolerite, microgabbro) 2. Size: 33x35x22 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive gabbro, ophytic 7. Matrix: some gradation from melanocratic (Px > Plg) to leucocratic (Plg > Px) with some large Plg crystals (≤2mm) 8. Secondary Minerals: very minor 9. Encrustations: thin oxidation 10. Comment: very good for geochemistry, Ar-Ar. Should be checked for zircon	x (SAS)	1	1					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-13	1. Rock Type: insrusive melanocratic microgabbro 2. Size: 20x12x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: petrographically similar to -10 10. Comment: good for chemistry, maybe Ar-Ar	x (SAS)	x	?					
SO249-DR29-14	1. Rock Type: subvolcanic (dolerite) 2. Size: 16x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, doleritc 7. Matrix: palg elongated up to 0.5cm, ~50%; Px, Hbl ~50% 8. Secondary Minerals: minor actinolite, chlorite 9. Encrustations: thin film 10. Comment: appears to be good for geochemistry	x	x	1-2					
SO249-DR29-15	1. Rock Type: subvolcanic (dolerite) 2. Size: 27x18x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive 7. Matrix: similar to -9 8. Secondary Minerals: minor to moderate Actinolite, Chl, alteration halo 5mm 10. Comment: fresh, good for chemistry perhaps Ar-Ar	x	x	1-2					
SO249-DR29-16	1. Rock Type: subvolcanic (dolerite) 2. Size: 27x12x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: similar to -9 and -15 9. Encrustations: looks very fresh 10. Comment: good for geochemistry and Ar-Ar	x	x	1-2			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR29-17	1. Rock Type: volcanic rock, Px-Plg basalt 2. Size: 39x22x11 cm part of block S 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, matrix - massive, no vesicles 6. Phenocrysts: Plg ≤5mm, ~20%; CPx (Augite) ≤5mm, ~10-12% 7. Matrix: fine grained 8. Secondary Minerals: rel. minor, some Chl, Actinolite after Plg in matrix 10. Comment: very fresh, very good for geochemistry and Ar-Ar	x	x	1			MSC_GW	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-18	1. Rock Type: volcanic rock, Px-Plg basalt 2. Size: 22x22x17 cm, part of block Z 10. Comment: similar to -17; very good for geochemistry and Ar-Ar	1	1	1	x				
SO249-DR29-19	1. Rock Type: volcanic rock, Px-Plg basalt 2. Size: 23x14x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: overall similar to -17 5. Texture / Vesicularity: some vesicles (~5%) partly filled with blueish-green material 10. Comment: somewhat more altered than -17 & 18 but still good for geochemistry and dating	x	x	2					
SO249-DR29-20	1. Rock Type: volcanic rock, Px-Plg andesitic basalt 2. Size: 10x8x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: overall similar to -17 bit more porphyritic 6. Phenocrysts: contains rel. large Plg phenocrysts 10. Comment: minor alteration but very good for geochemistry, represents somewhat different petrotype, ok for Ar-Ar	x	x	1-2					
SO249-DR29-21	1. Rock Type: volcanic rock (Plg phyric andesite?) 2. Size: 14x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, few vesicules 6. Phenocrysts: Plg ≤2 mm, ca. 5% 7. Matrix: medium grained, well crystallized 8. Secondary Minerals: minor alteration (Chl, filled vesicles) 10. Comment: good for chemistry and Ar dating. Relatively evolved compared to other samples (andesite?)	x	x	1-2			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR29-22	1. Rock Type: volcanic rock (Ol?-Plg-CPx basalt) 2. Size: 15x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, massive (no vesicules) 6. Phenocrysts: CPx - most abundant ca. 20%, ≤ 2 mm; Ol? (dark <1mm spots) ca. 5-7%, Plg <=2 mm, ca. 10%. 7. Matrix: fine grained, well crystallized 9. Encrustations: thin oxidation film on surface 10. Comment: good for chemistry, perhaps Ar-Ar too	x	x	-	Cpx		MSC_GW	TS by Airfreight, GC taken out	
SO249-DR29-23	1. Rock Type: Intrusive rock (sheared gabbro) 2. Size: 20x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 10. Comment: similar to -1 but somewhat sheared and therefore called interest. Not good for chemistry and Ar-Ar.	1 + SAS							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-24	1. Rock Type: volcanic rock (aphyric basalt) 2. Size: 13x9x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, vesicular: vesicules take up to 20% vol, up to 2 cm 7. Matrix: aphyric (cryptocrystalline) 8. Secondary Minerals: matrix is quite fresh. Vesicles are filled with zeolite, palagonite, Fe oxides. 9. Encrustations: thin film on surface, Fe oxidation along cracks. 10. Comment: relaively fresh aphyric basalt but secondary minerals from vesicles should be picked out before geochemistry.	x	x	-			MSC_GW	TS by Airfreight, GC taken out	
SO249-DR29-25	1. Rock Type: volcanic (aphyric basalt) 2. Size: 12x8x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: reddish grey 10. Comment: overall similar to -24 but vesicules are small (≤ 1 mm) and more abundant (maybe difficult to pick out). Matrix is slightly more crystallized than in -24 (fine grained to microlitic). Maybe good for chemistry but careful picking required to avoid vesicules filled with secondary minerals.	x	x	-					
SO249-DR29-26	1. Rock Type: volcanic rock (aphyric basalt) 2. Size: 10x8x7 cm 3. Shape / Angularity: subangualr 4. Color of cut surface: dark grey, somewhat red 10. Comment: similar to -24. but vesicles have variable size (≤0.5 cm). Some oxidation along cracks. Maybe good for chemistry. Careful picking is required to avoid white secondary minerals.	x	x						
SO249-DR29-27	1. Rock Type: volcanic rock (aphyric basalt) 2. Size: 11x7x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: reddish grey 10. Comment: similar to -24. Careful picking required to avoid secondary minerals, mostly white fillings in vesicles.	x	x						
SO249-DR29-28	1. Rock Type: volcanoclastic rock (breccia) 2. Size: 24x12x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: composed by clasts of diferent color (red, green, brown) 10. Comment: angular clasts represented by two major types: 1 - aphyric basalts, vesicular, possibly pillow margins, possibly contain altered olivin; 2 - green palagonite clasts, possibly replced volcanic glass. It is likely that samples -24 to -27 represent large clasts from such a volcanic breccia.								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR29-29	1. Rock Type: sedimentary rock - mudstone 2. Size: 12x12x10 cm (fragment of block R, 30 x 22 x 12 cm) 3. Shape / Angularity: subangular 4. Color of cut surface: yellowish to grey 5. Texture / Vesicularity: fine grained with layers of medium grained sandstone. 10. Comment: represents a common type of sediments from this dredge								
SO249-DR29-30	1. Rock Type: sediment (sandstone) 2. Size: 12x8x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: medium grained with laers of finer material, single grains are angular 10. Comment: a less abundant type of sediments								
SO249-DR29-31	1. Rock Type: sedimentary rock (claystone?) 2. Size: 14x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: blueish grey 5. Texture / Vesicularity: fine grained 10. Comment: subordinate type of sediments from this dredge								
Archive samples:	Additional material from large samples								
SO249-DR29-X31	= -2								
SO249-DR29-X32	= -1								
SO249-DR29-X33	= -9								
SO249-DR29-X34	= -8								
SO249-DR29-X35	= -12								
SO249-DR29-X36	= -17								
SO249-DR29-X37	= -18								
SO249-DR29-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR30

Murray Canyon; further upslope of DR29

Dredge on bottom UTC 17/06/16 18:59 hrs, lat 51°40.76'N, long 176°47.92'E, depth 2194 m

Dredge off bottom UTC 17/06/16 20:09hrs, lat 51°40.35'N, long 176°48.10'E, depth 1825 m

total volume: 1/4 full

Comments: Three lithologies identified. Volcanics posess variable amounts of Plg and Px phenocrysts. Three plutonics (-4, -5 and -8) are made of Plg and Px in about equal amounts. Sediments are medium to fine grained and in places laminated. Sample -1 is the most porhyric volcanic while the other volcanics contain significantly less phenocrysts. All igneous rocks are fairly fresh and suitable for geochemistry and age dating

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR30-1	1. Rock Type: volcanic 2. Size: 34x16x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, thin alteration halo (~5 mm) 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (15-20%), Px (5-7%) - black OPx? , CPx - tourqoise 7-10%?, Ol? 7. Matrix: fine grained, dark grey 8. Secondary Minerals: Pyrite <1%, <1 mm. 10. Comment: very large phenocyrsts	x	x	1			MSC_GW	TS+GC to GW by Airfreight	
SO249-DR30-2	1. Rock Type: volcanic 2. Size: 26x16x10 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey, alteration halo ~7 mm. 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp 2-3%, <1mm, white; Px? 7-10%, 1-5 mm black; (unknown phase)= tourqoise in color 1-5 mm 15-20%. 7. Matrix: fine grained, medium grey, alteration along cracks throughout 10. Comment: a vein of less altered rock wih small phenocrysts cuts through the rock. There are large areas of only tourqoise colored alteration (ca. 20 mm)	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR30-3	1. Rock Type: Volcanic 2. Size: 18x14x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg <1%, black prismatic mineral (Hbl?) 10%, up to 3mm, CPx 3%, 2mm. 7. Matrix: fine grained 8. Secondary Minerals: alteration along fractures	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR30-4	1. Rock Type: intrusive, gabbro 2. Size: 11x8x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic ?? 6. Phenocrysts: Minerals: Plg 50% 1 mm, black prismatic mineral 50% 7. Matrix: fine grained 10. Comment: this rock is fresh	x	x	1			MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR30-5	1. Rock Type: intrusive, gabbro 2. Size: 15x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Plg (60%, 2 mm), black prismatic mineral (40%, 2mm) 7. Matrix: medium grained 10. Comment: this rock is fresh and similar to -4	x	x	1					
SO249-DR30-6	1. Rock Type: volcanic 2. Size: 15x10x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 1 mm), black prismatic mineral (5%, 1mm). 7. Matrix: dense fine grained 10. Comment: this rock is fresh	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR30-7	1. Rock Type: volcanic 2. Size: 12x9x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2 mm), black prismatic mineral (Amph?, 10%, 2mm) 7. Matrix: dense 10. Comment: this rock is fresh	x							
SO249-DR30-8	1. Rock Type: intrusive 2. Size: 12x10x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Px (5%, 4 mm) Bt? (1%, <1 mm), Amph (15%, 1 mm) 7. Matrix: alteration halo 2 mm	x							
SO249-DR30-9	1. Rock Type: volcanic 2. Size: 27x24x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: green to black 5. Texture / Vesicularity: porhyritic, very crystalline, 10% vesicles 6. Phenocrysts: Plg 25% up to 1cm, black prismatic mineral 15%, 3mm 7. Matrix: fine grained 8. Secondary Minerals: Actnolite, alteration halo 2cm	x							
SO249-DR30-10	1. Rock Type: volcanic 2. Size: 12x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey to white 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Fsp 40%, 2mm 7. Matrix: dense	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR30-11	1. Rock Type: volcanic 2. Size: 9x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey to white 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Fsp 20%, 1 mm 7. Matrix: dense 8. Secondary Minerals: sulfide <1%, <1 mm	x							
SO249-DR30-12	1. Rock Type: volcanic 2. Size: 13x12x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 1 mm), black mineral (1%, 1 mm) 7. Matrix: dense 8. Secondary Minerals: alteration halo ~5 mm, white vein cuts across the rock	x							
SO249-DR30-13	1. Rock Type: sedimentary 2. Size: 10x10x15 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: fine to medium grained, sorted, clasts angular to subangular 8. Secondary Minerals: alteration halo 5 mm	x							
SO249-DR30-14	1. Rock Type: sedimentary, silty mudstone 2. Size: 34x23x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: laminated (partly) silt and mud 8. Secondary Minerals: alteration halo 1.5 cm, vein of black material (fossil?) cuts throughout the bloc perpendicular to the lamination	x							
SO249-DR30-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR31

Murry Canyon. SE slope, lower part

Dredge on bottom UTC 17/06/16 23:44hrs, lat 51°37.13'N, long 176°33.28'E, depth 4280 m

Dredge off bottom UTC 18/06/16 01:10 hrs, lat 51°36.75'N, long 177°33.56'E, depth 3863 m

total volume: few rocks

Comments: solidified sediments and a single volcanic rock

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR31-1	1. Rock Type: volcanic, relatively fresh 2. Size: 12x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Fsp (5%, 2-6 mm), mafic mineral (Amph?, 2%, 1-3 mm) 7. Matrix: fine grained 9. Encrustations: thin Mn coating 10. Comment: geochmistry slab consists of 2 blocs; this is the sole volcanic rock recovered in this dredge	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR31-2	1. Rock Type: sediment, slightly altered 2. Size: 16x12x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey with brownish alteration rim 5 mm, small grains have large variaty of colors 5. Texture / Vesicularity: laminated, variation in grain size (1-6 mm), coarses at the top and bottom, sometimes clasts can be identified 7. Matrix: fine grained	x					MSC_GW	TS by Airfreight, GC taken out	
SO249-DR31-3	1. Rock Type: sediment, slightly altered 2. Size: 17x16x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey with brownish alteration rim 5-15 mm, small grains have large variety of colors. 5. Texture / Vesicularity: fine grained, fine lamination is visible at some parts of the rock 7. Matrix: fine grained 10. Comment: it is difficult to distinguish between grains and the matrix	x							
SO249-DR31-4	1. Rock Type: sediment, slightly altered 2. Size: 11x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light grey with brownish alteration rim 5-7 mm 5. Texture / Vesicularity: small grains in fine grained matrix (sub mm). No lamination visible, few larger clasts with size of ~3 mm 7. Matrix: fine grained	x							
SO249-DR31-5	1. Rock Type: sediment, relatively fresh 2. Size: 10x6x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, small alteration parts are brownish, grains are mostly white or black, some grains are red and grey 5. Texture / Vesicularity: small grains (sub-mm to 2 mm) in a fine-grained matrix without lamination 7. Matrix: fine-grained 10. Comment: grains are coarser than in sample -2 and -4.	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR31-6	1. Rock Type: sediment, relatively altered 2. Size: 9x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey, brownish alteration rim (3-10 mm), no grains visible 5. Texture / Vesicularity: thin lamination (looks like wave ripples), fine-grained 10. Comment: similar to sample -3. No TS because of too many cracks								
SO249-DR31-7	1. Rock Type: sediment, relatively fresh (breccia) 2. Size: 15x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey, green, blue and light purple clasts, matrix - grey and white 5. Texture / Vesicularity: large angular clasts 5-10 mm, poorly sorted, only small parts are formed by the matrix 7. Matrix: fine-grained matrix, only 5-10% matrix has small vesicles 10. Comment: different from the other sediments on this station								
SO249-DR31-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR32

Murray Canyon. Base of western section of N slope

Dredge on bottom UTC 18/06/16 05:48hrs, lat 51°30.48'N, long 176°03.49'W, depth 4197 m

Dredge off bottom UTC 18/06/16 07:05hrs, lat 51°30.87'N, long 176°03.39'W, depth 3816 m

total volume: 1/6 full, fairly small rock pieces

Comments: Abundant semi-consolidated sediment, several lava fragments, ranging from vesicular to dense. The vesicular lavas (-1 and -2) are slightly (3%) Plg phyric, whereas the dense samples (-3 to -7) contain up to 25% Plg phenocrysts along with Px? or Amph? (7-15%).

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR32-1	1. Rock Type: volcanic (basalt) 2. Size: 22x18x14 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular (15%), few vesicles are partialy filled with green material 6. Phenocrysts: Plg (3%, 1mm) 8. Secondary Minerals: alteration halo (~2mm), oxidized 10. Comment: samples -1 and -2 are similar	x	x				MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR32-2	1. Rock Type: volcanic, basalt 2. Size: 9x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular (15%), few vesicles are partially filled with green material 6. Phenocrysts: Plg (3%, 1mm) 8. Secondary Minerals: alteration halo (~5mm) 10. Comment: samples -1 and -2 are similar	x							
SO249-DR32-3	1. Rock Type: volcanic 2. Size: 9x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 1mm), Px (3%, 1mm) 7. Matrix: dense 10. Comment: samples -3 to -7 are a group of porphyritic rocks with Plg phenocrysts ± Px/Amph?	x							
SO249-DR32-4	1. Rock Type: volcanic 2. Size: 10x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (3%, 1mm), Px (1%, 1mm) 7. Matrix: dense 10. Comment: samples -3 to -7 are a group of porphyritic rocks with Plg phenocrysts ± Px/Amph?	x							
SO249-DR32-5	1. Rock Type: volcanic 2. Size: 12x8x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (25%, 1mm), Px (7%, 3mm) 7. Matrix: dense 8. Secondary Minerals: alteration halo (~3mm) 10. Comment: samples -3 to -7 are a group of porphyritic rocks with Plg phenocrysts ± Px/Amph?	x	x					TS by Airfreight, GC taken out	
SO249-DR32-6	1. Rock Type: volcanic 2. Size: 9x7x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (20%, 1mm), Amph (25%, 2mm) 7. Matrix: fine grained, Plg 8. Secondary Minerals: alteration halo (~1mm) 10. Comment: samples -3 to -7 are a group of porphyritic rocks with Plg phenocrysts ± Px/Amph?	x							
SO249-DR32-7	1. Rock Type: volcanic 2. Size: 6x4x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (3%, 1mm), black prismatic mineral (15%, 2mm) 7. Matrix: fine grained 10. Comment: samples -3 to -7 are a group of porphyritic rocks with Plg phenocrysts ± Px/Amph?	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR32-8	1. Rock Type: volcanic 2. Size: 10x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, <1mm), black mineral (5%, <1mm) 7. Matrix: dense								
SO249-DR32-9	1. Rock Type: sedimentary 2. Size: 15x8x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sorted, fine to medium grained 10. Comment: samples -9 to -11 are a group of fine to medium grained sedimentary rocks	x							
SO249-DR32-10	1. Rock Type: sedimentary 2. Size: 14x9x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: fine to medium grained 8. Secondary Minerals: alteration halo (~1 cm) 10. Comment: samples -9 -to -11 are a group of fine to medium grained sediment rocks	x							
SO249-DR32-11	1. Rock Type: sedimentary 2. Size: 8x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: sorted, fine grained 10. Comment: samples -9 to -11 are a group of fine to medium grained sediment rocks	x							
SO249-DR32-12	1. Rock Type: sedimentary 2. Size: 25x22x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: medium to coarse grained angular clasts 7. Matrix: mud matrix								
SO249-DR32-13	1. Rock Type: sedimentary 2. Size: 14x12x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: well sorted silt 7. Matrix: mud matrix 8. Secondary Minerals: alteraion halo (5mm)								
SO249-DR32-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR33

Aleutian Trench. Hanging wall immediately above trench SE facing slope along bend in E-W striking hanging wall

Dredge on bottom UTC 18/06/16 14:43hrs, lat 51°04.38'N, long 175°32.39'W, depth 6790 m

Dredge off bottom UTC 18/06/16 16:36hrs, lat 51°04.84'N, long 175°31.94'W, depth 6505 m

total volume: 1/4 full

Comments: Semiconsolidated sediments (mud)

SO249-DR33-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR34

Aleutian Trench. NW slope of the trench

Dredge on bottom UTC 19/06/16 01:43hrs, lat 51°16.85'N, long 174°49.50'E, depth 6079 m

Dredge off bottom UTC 19/06/16 03:16hrs, lat 51°17.21'N, long 174°49.16'E, depth 5703 m

total volume: 1/4 full

Comments: Large blocs of two types of solidified sediment a) fine grained medium grey mudstone (-2), b) silt stone green grey (-3). Smaller pieces of semiconsolidated mud (-4). Single subangular piece of medium grained, matrix supported breccia with mm sized fragments (-1).

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR34-1	1. Rock Type: sedimentary, matrix supported breccia 2. Size: 9x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: poorly sorted fine to coarse grained, subangular to subrounded clasts, few pebble sized clasts	x							
SO249-DR34-2	1. Rock Type: sedimentary, silty mudstone 2. Size: 52x38x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted mud 8. Secondary Minerals: alteration halo (5mm)								
SO249-DR34-3	1. Rock Type: sedimentary 2. Size: 32x28x16 cm 3. Shape / Angularity: subangular 4. Color of cut surface: green grey 5. Texture / Vesicularity: well sorted silt 8. Secondary Minerals: a mud vein cuts through the rock and there is an alteration halo (~5mm)								
SO249-DR34-4	1. Rock Type: sedimantary, semiconsolidated 2. Size: 20x17x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: tan 5. Texture / Vesicularity: well sorted mud								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR34-5	1. Rock Type: sedimentary 2. Size: 7x6x4 cm 3. Shape / Angularity: rounded 4. Color of cut surface: brown 5. Texture / Vesicularity: poorly sorted fine to coarse grained sand with pebbles 8. Secondary Minerals: highly altered								
SO249-DR34-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR35

Western Cones; N of Attu. Small cone on a NW striking slope. Eastward dipping slope

Dredge on bottom UTC 20/06/16 01:22hrs, lat 52°24.15'N, long 172°11.95'E, depth 3549 m

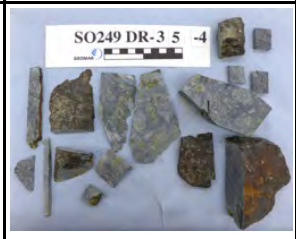
Dredge off bottom UTC 20/06/16 02:42hrs, lat 53°23.75'N, long 172°11.79'E, depth 3351 m

total volume: 1/3 full

Comments: A few relatively large pieces of igneous rocks (volcanics & plutonics) and solidified sediment, semiconsolidated sediments and a lot mud. Sample -1 and -2 are fresh Plag-Px phyric lavas that appear to originate from the cone and thus are priority samples. A quarter of -1 and -2 are taken by GY. Plutonics (-3 & -5), volcanics (-4) and sediments (-6 & -7) are either reworked material by the fault zone on which the cone sits or dropstones.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR35-1	1. Rock Type: volcanic; lava fragment 2. Size: 22y15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, few vesicles (<1%) 6. Phenocrysts: Plg (10%, 2mm), CPx (5%, 3mm) 7. Matrix: dense 10. Comment: very fresh rock, suitable for geochemistry and possible Ar-Ar dating depending on presumed age of structure. Could be geologically fairly young.	x	x					1/4 of sample to GY	
SO249-DR35-2	1. Rock Type: volcanic 2. Size: 14x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2%, 2mm) 7. Matrix: dense, Plag in groundmass 8. Secondary Minerals: alteration along cracks with thin red-orange oxidation halo 10. Comment: appears to be the most mafic rock of DR35 due to least amount of phenocrysts	x	x					1/4 of sample to GY	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR35-3	1. Rock Type: intrusive 2. Size: 19x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Amph (15%, 3mm), Fsp (30%, 2mm) 8. Secondary Minerals: alteration halo along outer rim of piece and along fractures	x	x						
SO249-DR35-4	1. Rock Type: volcanic 2. Size: 14x13x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2mm); Amph (3%, 1mm) 8. Secondary Minerals: patches of yellowish green alteration in groundmass and alteration along fractures	x	x						
SO249-DR35-5	1. Rock Type: plutonic 2. Size: 13x8x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: holocrystalline, medium grained 6. Phenocrysts: Amph (5%, 1mm), Fsp (30%, 2mm) 8. Secondary Minerals: few fractures show signs of alteration	x (SAS)							
SO249-DR35-6	1. Rock Type: sedimentary 2. Size: 25x16x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: fine grained sand + silt + mud, sorted 8. Secondary Minerals: alteration halo (~1cm)								
SO249-DR35-7	1. Rock Type: sediment, mud stone 2. Size: 20x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted mud 8. Secondary Minerals: alteration halo (~1cm)								
SO249-DR35-8X	two additional small, angular pieces of igneous rock								no picture taken
SO249-DR35-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR36

Western Cones; N of Attu. Very small cone on WNW-ESE striking ridge north of DR35 along north dipping slope

Dredge on bottom UTC 20/06/16 05:54hrs, lat 53°24.67'N, long 172°09.59'E, depth 3649 m

Dredge off bottom UTC 20/06/16 06:44hrs, lat 53°24.43'N, long 172°09.29'E, depth 3575 m

total volume: empty

SO249-DR36-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR37

Western Cones; N of Attu. Multiple cones, elongated in NNW-SSE direction. Dredge track along N dipping slope of central large cone from middle section to top

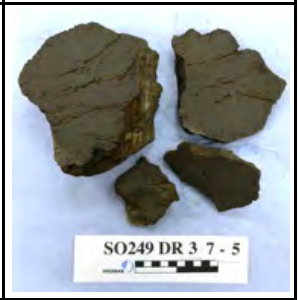
Dredge on bottom UTC 20/06/16 09:56hrs, lat 53°25.82'N, long 172°4.33'E, depth 3643 m

Dredge off bottom UTC 20/06/16 11:20hrs, lat 53°25.48'N, long 172°4.20'E, depth 3339 m

total volume: *1/5 full*

Comments: Safety cable got wrapped around chain bag. Recovered very fresh pieces of large Hbl bearing pillow lava (sample -1 to -6) without glassy margins. Second lava type (sample -7 to -10) is aphyric and pieces vary by vesicularity. Both lava types presumably have high magnesium rhyodacitic compositon based on similar appearance to other Western cones sampled in 2009 during cruise SO201-1b.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR37-1	1. Rock Type: volcanic; radial cooling fractures and rounded outer shape resemble pillow lava but without glassy margin 2. Size: 43x26x26 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: small Amph needles (5%, 2mm) 7. Matrix: aphyric, dense 8. Secondary Minerals: beige alteration along fractures 9. Encrustations: Mn crust (<1mm) 10. Comment: samples -1 to -6 are a group of Amph phyric lavas with varying vesicularity. All are very fresh and appear geologically young	x	x					sampled by GY	
SO249-DR37-2	1. Rock Type: volcanic 2. Size: 32x24x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, 3% vesicularity evenly distributed 6. Phenocrysts: Amph (5%, 2mm) 7. Matrix: aphyric 8. Secondary Minerals: alteration along fractures, though there are not many fractures	x	x					sampled by GY	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR37-3	1. Rock Type: volcanic, fresh lava 2. Size: 28x16x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, 5% vesicularity 6. Phenocrysts: Amph (5%, 2mm) 7. Matrix: aphyric 9. Encrustations: Mn crust (<1mm)	x	x					sampled by GY	
SO249-DR37-4	1. Rock Type: volcanic 2. Size: 24x14x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (3%), some vesicles are partially filled with light yellow altration 6. Phenocrysts: Amph (2%, 1mm) 7. Matrix: aphyric 8. Secondary Minerals: altration along the few fractures 9. Encrustations: Mn crust (<1mm)	x	x					sampled by GY	
SO249-DR37-5	1. Rock Type: volcanic, fresh lava 2. Size: 16x15x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (7%), some partially filled vesicles with yellowish alteration 6. Phenocrysts: Amph (5%, 1mm) 7. Matrix: aphyric 8. Secondary Minerals: alteration along fractures							sampled by GY	
SO249-DR37-6	1. Rock Type: volcanic, fairly fresh lava 2. Size: 13x13x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (3%) 6. Phenocrysts: Amph 7. Matrix: aphyric 8. Secondary Minerals: alteration around vesicles							sampled by GY	
SO249-DR37-7	1. Rock Type: volcanic 2. Size: 10x10x8 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric vesicular (2%), some vesicles are partially filled with yellow alteration 10. Comment: samples -7 to -10 are a group of aphyric lavas with varying vesicularity							sampled by GY	
SO249-DR37-8	1. Rock Type: volcanic, aphyric lava 2. Size: 13x7x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, vesicular (3%) 9. Encrustations: Mn crust (<1mm)							sampled by GY	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR37-9	1. Rock Type: volcanic 2. Size: 16x13x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric							sampled by GY	
SO249-DR37-10	1. Rock Type: volcanic, aphyric lava 2. Size: 11x7x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, vesicular (10%), about half of the vesicles are filled with light brown matrial and the rest are partially filled							sampled by GY	
SO249-DR37-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR38

Western Cones; Lower section of large cone that was dredged during SO201 in the upper part. N facing slope. This is the largest cone of the NNE-SSW striking chain of cones NW of Attu.

Dredge on bottom UTC 20/06/16 14:40hrs, lat 53°29.14'N, long 171°59.57'E, depth 3554 m

Dredge off bottom UTC 20/06/16 16:16hrs, lat 53°29.89'N, long 171°58.84'E, depth 3024 m

total volume: *full*

Comments: Mostly angular fragments of dacitic lava (-1 to -8). A few other lithologies (andesites, granite, sediments) are probably dropstones.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR38-1	1. Rock Type: volcanic rock, fresh dacite 2. Size: fragment of bloc U; 40x25x20 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, vesicular (10-15%), fluidal 6. Phenocrysts: Mg-Hbl (dark green neeedles up to 5mm long, ~15%), Plg (colorless, ≤2-3mm, ~10%), OPx (light green, ≤1mm, <2-3%) 7. Matrix: holocrystalline to microlites, more glassy near vesicles 8. Secondary Minerals: rare blueish-green fillings of vesicles 9. Encrustations: Minor oxidation on surface along cracks 10. Comment: Typical rock type for this dredge. It is simlar to some types of rocks (rhyodacites) dredged in Western cones in 2009) SO201-1b	x	x	x	Hbl-Plg		x		

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR38-2	1. Rock Type: volcanic, fresh 2. Size: 17x17x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey to black 5. Texture / Vesicularity: porphyric, vesicular (10-15%) 6. Phenocrysts: Hbl needles, 1-2mm long, 15% 7. Matrix: similar to -1 9. Encrustations: minor oxidation of surface & fractures 10. Comment: vesicles are elongated, aligned in flow direction(?) which may indicate more viscous lava composition								
SO249-DR38-3	1. Rock Type: volcanic, fresh 2. Size: 18x16x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey black 5. Texture / Vesicularity: porphyritic, vesicular (10-15%) 6. Phenocrysts: Hbl needles 7. Matrix: fine grained, glassy 8. Secondary Minerals: tan-white vesicle fill	x	x	x			x		
SO249-DR38-4	1. Rock Type: volcanic, fresh 2. Size: 25x25x18 cm, part of bloc O 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey black 5. Texture / Vesicularity: porphyritic, vesicular (5-10%) 6. Phenocrysts: Hbl needles (1-4mm, 10-15%) 7. Matrix: fine grained glassy 8. Secondary Minerals: rare brown vesicle fill 9. Encrustations: slight oxidation of surface and fractures 10. Comment: similar to sample -1 to -3; maybe slightly less vesicular	x	x	x	Hbl		x		
SO249-DR38-5	1. Rock Type: volcanic, fresh dacite 2. Size: 19x12x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey - black 5. Texture / Vesicularity: porphyritic, vesicular (10-15%) 6. Phenocrysts: Hbl needles, similar to sample -1 to -4 7. Matrix: fine grained glassy, light grey xenolith ø 7mm 9. Encrustations: oxidation, alteration of surface, oxidized fractures 10. Comment: similar to -1 to -4								
SO249-DR38-6	1. Rock Type: volcanic , dacite, fresh 2. Size: 19x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey black 5. Texture / Vesicularity: porphyric with Hbl, Plg phenocrysts, vesicular 6. Phenocrysts: similar to-1 10. Comment: concentric fractures, overall appears more glassy	x	x	x			x		

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR38-7	1. Rock Type: volcanic, dacite, fresh, similar to -1 2. Size: 18x12x10 cm 10. Comment: distinctive features; slightly more high Mg Opx (1-2%); angular inclusions of Hbl-Plg dacite of white color. Perhaps more crystallized then most other dacites								
SO249-DR38-8	1. Rock Type: volcanic dacite, slightly altered 2. Size: 12x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: yellowish grey 5. Texture / Vesicularity: more massive than other samples, vesicles ≤5%, ≤ 2mm 6. Phenocrysts: Hbl ≤10%, brownsh grey, ≤2mm, Plg ≤20% (?), colorless needles; OPx? 7. Matrix: fine crystallized, microcrystalline 8. Secondary Minerals: alteration halo ~5mm 9. Encrustations: Oxidation and Mn film on surface 10. Comment: similar type of rock as -1 to -7 but more altered which may represent earlier eruptions								
SO249-DR38-9	1. Rock Type: volcanic, fairly fresh andesite? 2. Size: 16x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg: 3-4 mm, 10%; Amph: 1-3 mm, 7-10%; Px (?) ≤1mm, 10% 7. Matrix: fine grained 8. Secondary Minerals: alteration halo ~10mm 9. Encrustations: thin Fe-Mn crust 10. Comment: Plg phenocyrsts are fresh and good for dating. Thick alteration halo and differences in mineralogy indicate that this rock is either talus from older strata or a dropstone	x	x	x					
SO249-DR38-10	1. Rock Type: volcanic, fresh, Plg phyric lava 2. Size: 9x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, medium grained 6. Phenocrysts: Plg; 3-4mm, ~15-20% 7. Matrix: fine grained 8. Secondary Minerals: yellowish altered Plg 9. Encrustations: thin Fe-Mn crust 10. Comment: similar texture to -9 but lacks Amph / Px (?) phenocrysts. Plg crystals are larger and more abundant. Unlclear wether older strata or dropstone.	x		x					
SO249-DR38-11	1. Rock Type: meta-sedimentary 2. Size: 13x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: massive, laminated 7. Matrix: wavy, cross laminated, silt sized grains 9. Encrustations: thin Fe-Mn crust 10. Comment: altered mud stone								

Archive Samples: Five subrounded to well rounded pebbles; likely dropstones									
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR38-12X-1	1. Rock Type: volcanic, medium altered 2. Size: 8x5x6 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: pale grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Amph (10%), ±Ol altered (5-7%) 7. Matrix: aphyric, fine grained 8. Secondary Minerals: Chl, ± Fe-oxides 10. Comment: Ar-Ar, Amph if available			x					
SO249-DR38-12X-2	1. Rock Type: volcanic altered, Ol-Plg-Px basalt 2. Size: 10x8x6 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Ol, 15-20%, Pl, 40%, Px, 20%; other aphyric matrix 7. Matrix: fine grained 8. Secondary Minerals: Chl, Actinolite 10. Comment: Ar-Ar, Pl but very altered								see -12X-1
SO249-DR38-12X-3	1. Rock Type: volcanic, Ol-Px ±Pl, altered basalt 2. Size: 6x4x4 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: pale grey 5. Texture / Vesicularity: pophyric 6. Phenocrysts: Ol-15%, Px - 20%, Pl - 10% (?) 7. Matrix: fine grained 8. Secondary Minerals: Act, Chl 9. Encrustations: none								see -12X-1
SO249-DR38-12X-4	1. Rock Type: subvolcanic, diabase 2. Size: 15x10x9 cm 3. Shape / Angularity: very slightly rounded 4. Color of cut surface: grey-greenish 5. Texture / Vesicularity: massive 7. Matrix: massive, granoblastic 8. Secondary Minerals: Amph, Chl 9. Encrustations: none 10. Comment: Ar/A -> Amph								see -12X-1
SO249-DR38-12X-5	1. Rock Type: plutonic, K-Fsp bearing granite 2. Size: 15x10x10 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: pink- grey 5. Texture / Vesicularity: granitic, granoblastic 6. Phenocrysts: K-Fsp (40%), Qtz (20%), ±Amph (10%), Plg (20%) 7. Matrix: ganoblastic 8. Secondary Minerals: possibly Ep, Muscovite (Sericite) 9. Encrustations: none 10. Comment: K-Fsp --> Ar/Ar								see -12X-1

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR38-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR39

Kresta Ridge: South facing slope along lower section

Dredge on bottom UTC 20/06/16 20:55hrs, lat 53°16.23'N, long 171°35.70'E, depth 3342 m

Dredge off bottom UTC 20/06/16 22:28hrs, lat 53°16.68'N, long 171°35.80'E, depth 2903 m

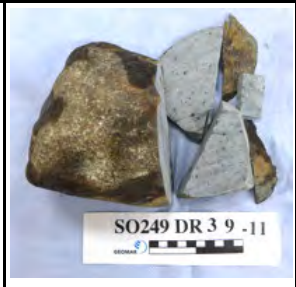
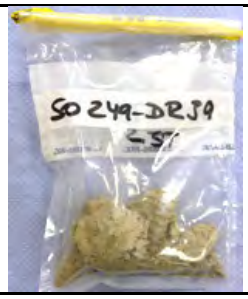
total volume: 1/4 full

Comments: Mostly volcanic and sedimentary breccia, tectonites. Some small igneous rocks of volcanic and plutonic provenance.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR39-1	1. Rock Type: lithoclastic tectonic breccia hydrothermally altered, diabase in lithoclasts 2. Size: fragment of block "L" = 32x23x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey to green 5. Texture / Vesicularity: brecciated / cataclastic 6. Phenocrysts: none 7. Matrix: breccia matrix is medium to coarse grained 8. Secondary Minerals: carbonate veins with ±Ep, ±Chl; abundant sulfide in matrix 9. Encrustations: Fe-oxides 10. Comment: diabase (or basalt ?) fragments can be picked out from crushed rock and used for chemistry. Pyrite could be measured for sulfur isotopes.	x(x_SAS)							
SO249-DR39-2	1. Rock Type: Hydrothermally reworked tectonic breccia similar to sample -1. 2. Size: fragment of block "S": 27x21x21 cm 10. Comment: diabase (or basalt ?) fragments can be picked out from crushed rock and used for chemistry. Pyrite could be measured for S isotopes.	x(x_SAS)							
SO249-DR39-3	1. Rock Type: Volcanc. Ol-Plg basalt strongly hydrothermally altered. 2. Size: 18x12x10 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic with many cc veines 6. Phenocrysts: Ol, 20%, Plg 20-25%, possible Px 7. Matrix: aphyric to fine grained 8. Secondary Minerals: Cc, Chl 9. Encrustations: ≤2 mm 10. Comment: Ol is relatively fresh, good to study	x(x_SAS)	x		OL		MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR39-4	1. Rock Type: lithoclastic tectonic breccia with hydrothermally altered diabase clasts. Similar to -1, -2 2. Size: 13x9x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: brecciated (cataclastic) 7. Matrix: fine grained, possibly relics of Plg and Px. 8. Secondary Minerals: Cc, Chl, Qtz? 9. Encrustations: very thin outer crust	x(x_SAS)							
SO249-DR39-5	1. Rock Type: Sedimentary tectonic breccia with small to medium sized lithoclasts composed by volcanic; sedimentary rock. Strongly altered 2. Size: 13x9x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: brecciated 7. Matrix: fine grained 8. Secondary Minerals: Chl, Qtz, Actinolite, clay minerals 9. Encrustations: none	x(x_SAS)							
SO249-DR39-6	1. Rock Type: Completely hydrothermally altered rock 2. Size: 13x8x4 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: cataclastic 8. Secondary Minerals: Cc, Chl, Actinolite 10. Comment: good for stable isotope study	x(x_SAS)							
SO249-DR39-7	1. Rock Type: brecciated diabase, strongly altered 2. Size: 15x11x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: deep grey almost black 5. Texture / Vesicularity: massive in clast; brecciated (cataclastic) 7. Matrix: in lithoclasts fine-grained. Plg+Px small patches in aphyric matrix 8. Secondary Minerals: Chl, Cc, +/-Qtz 9. Encrustations: 2-3 mm Mn-crust	x(x_SAS)							
SO249-DR39-8	1. Rock Type: Plutonic. Diorite. Very low degree of alteration (?) 2. Size: 14 10 x 9 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: granoblastic to glomeroporphyric 6. Phenocrysts: 7. Matrix: Plg, Hbl, Px, Qtz? 8. Secondary Minerals: Act, Chl, Cc 9. Encrustations: none 10. Comment: Pl, Hbl can be used for dating.	x(x_SAS)		1-2					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR39-9	1. Rock Type: plutonic, dolerite / diabase 2. Size: 12x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: granoblastic 7. Matrix: fine to medium grained; Plg 30%, Px 40%, others - unclear. 8. Secondary Minerals: Amph, Chl 10. Comment: Plg can be used for Ar-Ar dating	x(x_SAS)	1	1					
SO249-DR39-10	1. Rock Type: subvolcanic rock. Micro-dolerite or massive aphyric basalt. Low degree of alteration 2. Size: 13x13x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric 7. Matrix: very fine grained. Plg ca.40%, Px ca.40%, secondary minerals 20% 8. Secondary Minerals: Chl, Act 9. Encrustations: Fe oxides 2 mm								
SO249-DR39-11	1. Rock Type: Plutonic/subvolcanic, micro Diorite, low degree of alteration. 2. Size: 22x15x15 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: granoblastic 7. Matrix: Fine to medium grained. Plg 20%, Pc 40%, Amph 15%. 8. Secondary Minerals: Act, Chl, Ep 9. Encrustations: Fe oxides <3 mm								
SO249-DR39-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR40

Kresta Ridge. Southern slope at its base

Dredge on bottom UTC 21/06/16 2:50hrs, lat 53°22.78'N, long 171°13.10'E, depth 3570 m

Dredge off bottom UTC 21/06/16 4:14hrs, lat 53°23.19'N, long 171°13.23'E, depth 3060 m

total volume: 1/4 full

Comments: Angular, freshly broken plutonic rocks. Hbl bearing granodiorite is the dominant lithology of the dredge. Variably deformed and overprinted by epidote veins. Abundant signs of brittle deformation such as striations along shear planes and riedel shears. In places glassy material cutting through host rock could be pseudotachylites resulting from high energy rupture of rock during earthquake leading to melting of host rock. A possible project is to reveal intrusion and cooling ages as well as timing of brittle deformation including upift history. Minor volcanics are slightly Plg ± Amph (?) phyric lava fragments (-9 to -12). -11 is a near aphyric variety.

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR40-1	1. Rock Type: plutonic, granodiorite 2. Size: 45x37x25 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey, white, black, pink, green 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 40%, Qtz 50%, Mica (Bt) 5%, Amph 10%, black mafic enclaves 8. Secondary Minerals: K-Fsp (veins), epidote on shear surfaces with slickensides 10. Comment: Samples -1 to -6 similar angular, plutonic rocks. Plg and Hbl suitable for Ar-Ar dating and potential U-Pb dating on zircons. Fission track dating may reveal uplift and cooling history	3x labelled A, B and C from diff. parts	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR40-2	1. Rock Type: plutonic, similar to -1 2. Size: 38x30x20 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-black, white-pink-green 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 35%, Qtz 50%, Mica (Bt) 5%, Amph 10% 8. Secondary Minerals: Epidote on shear planes. Xenolithic diabase enclave as separate GC sample 10. Comment: see sample -1	x	x						
SO249-DR40-3	1. Rock Type: plutonic, see sample -1 2. Size: 42x37x24 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-black-white-green-pink 5. Texture / Vesicularity: holocrystaline 6. Phenocrysts: Fsp 40%, Qtz 50%, Mica (Bt) 5%, Amph 3% 8. Secondary Minerals: Epidote on shear planes. Red patches on shear planes. Contact to diabase 10. Comment: see sample -1	x	x						
SO249-DR40-4	1. Rock Type: volcanic, basalt 2. Size: 15x14x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense, fine-grained, minor Fsp and dark minerals 9. Encrustations: Mn (<1 mm) 10. Comment: largest volcanic rock of dredge						MSC_GW	TS by Airfreight, GC taken out	
SO249-DR40-5	1. Rock Type: plutonic similar to -1 with sharp contact to glassy (pseudotachylite?) material 2. Size: 11x9x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: black-white-grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 40%, Qtz 50%, Bt 3%, Amph 3% 8. Secondary Minerals: black, glassy material could be a pseudotachylite. Red alteration along cracks 10. Comment: see sample 1; if pseudotachylite origin of glassy material holds true the high energy faulting event could be eventually dated by Ar-Ar	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR40-6	1. Rock Type: plutonic similar to -1 but with ductile deformed crystals 2. Size: 12x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish black-white-grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 40%, Qtz 50%, Bt 3%, Amph 3% 8. Secondary Minerals: greenish fillings parallel to foliation 10. Comment: similar to sample 1, but with signs of ductile deformation	x							
SO249-DR40-7	1. Rock Type: plutonic with ductile deformation 2. Size: 11x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish black-white-grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 40%, Qtz 50%, Bt 3%, Amph 3% 8. Secondary Minerals: greenish fillings 10. Comment: very similar to sample -6	x							
SO249-DR40-8	1. Rock Type: plutonic, similar to sample -1 2. Size: 16x15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: black-grey-white-green 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Fsp 40%, Qtz 50%, Bt 3%, Amph 5% 7. Matrix: 8. Secondary Minerals: Epidote on shear surfaces								
SO249-DR40-9	1. Rock Type: volcanic 2. Size: 13x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sparsly phyric 6. Phenocrysts: Fsp (<3 mm, 5%), black minerals (<1 mm, 2%) 7. Matrix: dense 8. Secondary Minerals: filled cracks 10. Comment: Volcanic rock with Plg phenocrysts	x							
SO249-DR40-10	1. Rock Type: volcanic 2. Size: 10x7x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sparsly phyric; vesicles (5%, <0.5 mm) 6. Phenocrysts: Fsp (1 mm, 3%), black minerals (< 1mm, 2%) 7. Matrix: dense 8. Secondary Minerals: filled cracks and vesicles (Cc) 10. Comment: similar to sample -9	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR40-11	1. Rock Type: volcanic 2. Size: 11x10x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 6. Phenocrysts: microphenocrystic Fsp (<0.1 mm, 1%), black minerals (<0.1 mm, 1%) 7. Matrix: dense 8. Secondary Minerals: filled cracks (reddish brown) 10. Comment: volcanic rock without bigger phenocrysts	x							
SO249-DR40-12	1. Rock Type: volcanic 2. Size: 16x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sparsely phyric; filled vesicles up to 2 mm, <2% 6. Phenocrysts: Fsp (<1 mm, 3%), black minerals (0.1 mm, 1%) 7. Matrix: dense 8. Secondary Minerals: filled cracks and vesicles (Cc) 10. Comment: similar to samples -9 and -10								
SO249-DR40-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR41

Kresta Ridge. ~2nm West of DR40. Mid section of south dipping slope below small ridge.

Dredge on bottom UTC 21/06/16 7:44hrs, lat 53°24.32'N, long 171°10.32'E, depth 3311 m

Dredge off bottom UTC 21/06/16 08:55hrs, lat 53°24.69'N, long 171°10.37'E, depth 2815 m

total volume: 1/2 full

Comments: At first glance the rocks appeared plutonic but after cutting they turned out to be mostly cataclasites (brittle deformed rocks) along with minor, angular fragments of volcanic rocks. The three large blocks recovered were also breccias / cataclasites characterized by dark green discoloration. Priority sample in terms of geochemistry and dating is sample -1.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR41-1	1. Rock Type: volcanic 2. Size: 19x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: CPx (1%, 2 mm), Plg (2%, 1 mm), Amph (?) (1%, 1 mm) 7. Matrix: fine grained 8. Secondary Minerals: white material in fractures 10. Comment: samples -1 to -6 are a group of volcanic rocks from dredge 41. Phenocrysts in sample -1 are fresh	x	x	x			MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR41-2	1. Rock Type: volcanic 2. Size: 10x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Ol (<1 %, 2 mm), CPx (1%, 2 mm), Plg (2%, 1 mm) 7. Matrix: fine grained 9. Encrustations: dark red encrustation (<1 mm)	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR41-3	1. Rock Type: volcanic 2. Size: 10x5x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Ol (1%, 2 mm), Plg (1%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: white material in fractures	x							
SO249-DR41-4	1. Rock Type: volcanic 2. Size: 10x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Ol (1%, 2 mm) 7. Matrix: fine grained, Plg and Px 8. Secondary Minerals: white material in fractures	x							
SO249-DR41-5	1. Rock Type: volcanic 2. Size: 10x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 1 mm), Amph (1%, 1 mm) 7. Matrix: fine grained 8. Secondary Minerals: white veins	x					MSC_GW	out	
SO249-DR41-6	1. Rock Type: volcanic 2. Size: 15x10x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2%, 1 mm), Px (2%, 1 mm) 7. Matrix: fine grained 8. Secondary Minerals: white and red veins	x							
SO249-DR41-7	1. Rock Type: meta volcanic 2. Size: 23x17x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: 6. Phenocrysts: Amph (5%, 2 mm) 7. Matrix: Fine to medium grained	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR41-8	1. Rock Type: sedimentary 2. Size: 10x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: layered fine grained sand 10. Comment: TS to confirm sedimentary origin	x							
SO249-DR41-9	1. Rock Type: meta volcanic 2. Size: 13x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: fine to coarse grained 8. Secondary Minerals: large white minerals as vesicle? Fillings	x							
SO249-DR41-10	1. Rock Type: similar to sample -9 2. Size: 12x8x7 cm	x							
SO249-DR41-11	1. Rock Type: breccia 2. Size: 18x8x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: Fine to coarse, angular grains 10. Comment: This is a group of samples (-1 to -16) representing the textural variations observed for the brittle deformed rocks in this dredge; making up the vast majority of rocks recovered	x							
SO249-DR41-12	1. Rock Type: cataclasite (breccia), protolith unclear, possibily aphyric basalt 2. Size: 22x14x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: dense 6. Phenocrysts: Plg, Epidote 8. Secondary Minerals: red veins 10. Comment: this type of rock is most abundant								
SO249-DR41-13	1. Rock Type: cataclasite (fault breccia) 2. Size: 17x11x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish- grey 5. Texture / Vesicularity: dense 6. Phenocrysts: Plg, Amph, Epidote 7. Matrix: angular to subangular cm sized grey clasts of aphyric basalt (?) 8. Secondary Minerals: red and white veins								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR41-14	1. Rock Type: cataclasite (fault breccia) 2. Size: 19x10x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 8. Secondary Minerals: greenish yellow veins								
SO249-DR41-15	1. Rock Type: cataclasite (breccia), strongly deformed 2. Size: 10x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light green 8. Secondary Minerals: white veins up to 1 cm thick								
SO249-DR41-16	1. Rock Type: cataclasite (breccia), strongly deformed 2. Size: 13x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: light green 8. Secondary Minerals: white veins, lots of epidote penetrating rock along fractures								
SO249-DR41-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR42

Aleutian trench; hanging wall. Indent into hanging wall, 30nm E of N-S trending part of Stalemate ridge. Upper section of ridge in hanging wall. Upper section of ridge that strikes WNW-ESE, slightly oblique to trench.

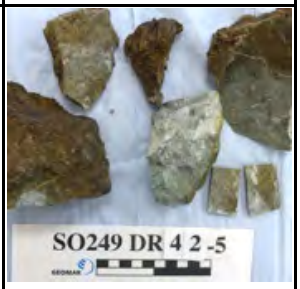
Dredge on bottom UTC 21/06/16 19:17hrs, lat 52°39.67'N, long 170°23.99'E, depth 6115 m

Dredge off bottom UTC 21/06/16 20:52hrs, lat 52°40.15'N, long 170°24.12'E, depth 5628 m

total volume: 2/3 full

Comments: Metasedimentary rocks: tuffs, breccias, argilites, some volcanic rocks. No Mn-crusts, typically 1-2 cm alteration halo. Cores are blueish-grey to green and suggest reducing conditions at sedimentation. The rocks are likely in-situ rocks exposed at young fault near Aleutian trench

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR42-1	1. Rock Type: sedimentary, highly altered tuffaceous(?) sandstone 2. Size: part of bloc X, 29x17x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: massive, med.sand to mud 5. Texture / Vesicularity: dense 7. Matrix: mud & fine sand 8. Secondary Minerals: sulfides (pyrite?), light colored vein fill 9. Encrustations: alteration halo (~10mm) 10. Comment: possibly tuffaceous	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR42-2	1. Rock Type: tuffaceous sandstone, strongly altered 2. Size: 20x10x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive, small voids (2-5 mm, 3-5%) 7. Matrix: fine volcaniclastic sand 8. Secondary Minerals: light grey fill in fractures & voids, sulfides 9. Encrustations: alteration halo (5-10mm) 10. Comment: voids are elongated, aligned; may be dissolved-out clast	x							
SO249-DR42-3	1. Rock Type: meta-gabbro 2. Size: 19x12x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: medium grained 7. Matrix: Plg, altered minerals (former Px?) 8. Secondary Minerals: Qtz veins 9. Encrustations: alteration halo 5-15mm 10. Comment: rock is very heavily altered making identification uncertain	x							
SO249-DR42-4	1. Rock Type: meta-volcanic 2. Size: 23x18x15 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: diabasic, fine grained, porphyritic 6. Phenocrysts: dark mineral, Amph?, 1-2%, 2-4mm 7. Matrix: fine grained 8. Secondary Minerals: light colored veins, Qtz?, sulfides 9. Encrustations: alteration halo, 5-20mm	x							
SO249-DR42-5	1. Rock Type: meta-sedimentary; altered mudstone 2. Size: part of bloc S; 41x23x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium brown, greyish green 5. Texture / Vesicularity: massively fractured 7. Matrix: mud 8. Secondary Minerals: Cc & Qtz veins 9. Encrustations: alteration halo ~15mm 10. Comment: rock is very heavily fractured	x							
SO249-DR42-6	1. Rock Type: volcaniclastic breccia, altered 2. Size: part of bloc N; 31x26x24 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish brown grey 5. Texture / Vesicularity: clast 6. Phenocrysts: clasts contain; Plg (1-2mm, 3-5%); Amph needles (<1mm, ~5%) 7. Matrix: clast matrix is fine grained, sedimentary matrix is mud 8. Secondary Minerals: light colored fracture fill 9. Encrustations: alteration halo (~10mm), thin Fe-Mn crust 10. Comment: clasts contain Plg phenocrysts for possible geochemisty; some phenocrysts have melt inclusions	x		2					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR42-7	1. Rock Type: meta-sedimentary 2. Size: 16x11x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive 7. Matrix: mud 8. Secondary Minerals: light colored veins 9. Encrustations: alteration halo ~4mm	x							
SO249-DR42-8	1. Rock Type: meta-sedimentary breccia 2. Size: 13x6x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium tan 5. Texture / Vesicularity: massive brecciated 6. Phenocrysts: sandstone clasts; fine to very coarse grains 7. Matrix: mud 8. Secondary Minerals: light colored veins and dark veins 9. Encrustations: none	x							
SO249-DR42-9X	1. Rock Type: volcanic-sedimentary, strongly altered meta-tuff with andesitic lithoclasts similar to sample -6								no picture taken
SO249-DR42-10X	1. Rock Type: volcanic-sedimentary 2. Size: 20x15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: cataclastic / partly brecciated 7. Matrix: fine grained; Chl + Qtz + Pyrite ±Px ±Plg + clay minerals								
SO249-DR42-11X	1. Rock Type: volcanic sedimentary rock (meta-tuff) 2. Size: 30x20x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: cataclastic / partly brecciated 7. Matrix: fine grained with thin Qtz veins; Chl + Qtz ±Pyrite + clay minerals 8. Secondary Minerals: Chl + Qtz + Py + clay minerals 9. Encrustations: Fe-Mn crust								
SO249-DR42-12X	1. Rock Type: volcanic sedimentary rock (meta-tuff) 2. Size: 20x15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: cataclastic / partly brecciated 7. Matrix: very fine grained with thin Qtz veins; Chl + Qtz ±Pyrite + clay minerals + Px + Plg 8. Secondary Minerals: Chl + Qtz + Py + clay minerals 9. Encrustations: Fe-Mn crust								
SO249-DR42-13X	1. Rock Type: volcanic sedimentary rock (meta-tuff) 2. Size: 20x15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: cataclastic / partly brecciated 7. Matrix: fine grained with thin Qtz veins; Chl + Qtz ±Pyrite + clay minerals ±Px ±Plg 8. Secondary Minerals: Chl + clay minerals + Py + Qtz 9. Encrustations: Fe-Mn crust								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR42-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR43

Inner slope of Aleutian Trench W of Attu. 4th step on the inner slope ~20km from trench axis

Dredge on bottom UTC 22/06/16 02:13hrs, lat 52°46.66'N, long 170°20.15'E, depth 5668 m
Dredge off bottom UTC 22/06/16 03:25hrs, lat 52°47.08'N, long 170°20.10'E, depth 5377 m

total volume: 1/6 full

Comments: safety cable wrapped around bag once. Semi-consolidated mud containing a single subrounded volcanic rock with 2% Hbl phenocrysts. Other hard rock is a fine grained, greyish sandstone (-2).

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR43-1	1. Rock Type: volcanic 2. Size: 9x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Hbl (2%, 1mm) 10. Comment: this is the only volcanic rock of DR43	x							
SO249-DR43-2	1. Rock Type: sedimentary 2. Size: 11x8x5 cm 3. Shape / Angularity: stongly rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: fine grained, well sorted sand surrounded by semiconsolidated silt	x							
SO249-DR43-3	1. Rock Type: breccia 2. Size: 6x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: light brown + grey 5. Texture / Vesicularity: fine to coarse angular clasts 7. Matrix: mud								
SO249-DR43-4	1. Rock Type: semi consolidated mud 2. Size: 10x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light brown								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR43-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR44

Aleutian Trench, hanging wall. Second "dent" in hanging wall WNW of DR42-43 area. Steep SSE facing slope from base.

Dredge on bottom UTC 22/06/16 11:03hrs, lat 52°49.79'N, long 169°57.37'E, depth 6670 m
Dredge off bottom UTC 22/06/16 12:50hrs, lat 52°50.25'N, long 169°57.21'E, depth 6209 m
total volume: 1/5 full
Comments: solidified and semi-consolidated sediments

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR44-1	1. Rock Type: sandstone 2. Size: 8x6x3 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted fine grained sand 8. Secondary Minerals: alteration halo 1-5mm 10. Comment: check TS if not igneous. In any case roundness indicates transport over large distances, reworking at beach or dropstone	x							
SO249-DR44-2	1. Rock Type: sediment, mudstone 2. Size: 16x13x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey to light brown 5. Texture / Vesicularity: well sorted mud								
SO249-DR44-3	1. Rock Type: sediment, siltstone 2. Size: 17x14x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted silt 8. Secondary Minerals: white veins throughout and some material on outside of the rok as if the rock broke along the vein / fracture								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR44-4	1. Rock Type: sediment, sandstone 2. Size: 10x14x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey and light brown 5. Texture / Vesicularity: fine grained sand, well sorted 8. Secondary Minerals: mud has filled in fractures of the rock								
SO249-DR44-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR45

Stalemate Fracture Zone. Northernmost part of FZ entering the trench. East East facing slope lower to mid-section corresponds to 2nd step from botom of the dredge

Dredge on bottom UTC 22/06/16 20:53hrs, lat 52°39.65'N, long 169°41.52'E, depth 5263 m

Dredge off bottom UTC 22/06/16 22:28hrs, lat 52°39.38'N, long 169°40.81'E, depth 4726 m

total volume: 1/2 full

Comments: Abundant polymict breccias, angular fragments of igneous and metamorphic rocks: 1) peridotites (harzburgites), 2) pyroxenites, 3) gabbro, 4) dolerites and diabases (dikes?) = predominant litho-type; Ol -phyric, Plg-phyric basalts / diabases. A few sedimentary rocks and Mn crusts.

Priority: All samples with numbers -11 through -30 are suitable for chemical analysis. Particularly fresh are gabbro and dolerites. Peridotite samples (-1 to -8) and pyroxenite samples (-9 & -10) are mostly for separation of fresh Spinel, OPx and CPx. For some peridotites GC slabs were also prepared. These rocks should be compared geochemically to those from Silantyev et al. (2014) and Lisa's PhD thesis. Breccia containing angular fragments of igneous rocks is likely related to tectonic defomation. Whether at transform flault or upon collision of the ridge with Aleutian trench is not clear. Amphibolite (-30) is important because it may represent the subophiolitic metamorphic sole. Protolith is unknown and it may be worth to obtain geochemical date and possibly age of metamorphism by dating the Hbl.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-1	1. Rock Type: intrusive, refered to as serpentinite, strongly altered 2. Size: 23x13x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: yellow-reddish 5. Texture / Vesicularity: granoblastic-banded-serpentinitic 6. Minerals: almost all minerals secondary; relics of Px, Spinel ± Ol 7. Matrix: fine medium grained 8. Secondary Minerals: Serpentine, Qtz, Chl, Fe-Mn Oxides 9. Encrustations: ~3mm Mn crust	x (1xSAS)	x						
SO249-DR45-2	1. Rock Type: intrusive; altered serpentinite. Same features as -1 2. Size: 12x11x10 cm 4. Color of cut surface: more brighter than -1	x (1xSAS)	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-3	1. Rock Type: intrusive, altered serpentinite 2. Size: 15x9x9 cm 4. Color of cut surface: bright reddish	x (1xSAS)							
SO249-DR45-4	1. Rock Type: same strongly altered serpentinite, maybe less altered than described above 2. Size: 13x10x6 cm	x (1xSAS)							
SO249-DR45-5	1. Rock Type: strongly altered serpentinite 2. Size: 10x7x5 cm	x (1xSAS)							
SO249-DR45-6	1. Rock Type: intrusive rock, strongly altered serpentinite 2. Size: 10x6x4 cm 4. Color of cut surface: same color	x (1xSAS)							
SO249-DR45-7	1. Rock Type: intrusive, strongly altered serpentinites 2. Size: 8x5x4 cm	x (1xSAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-8	1. Rock Type: intrusive, strongly altered; covered in thick Fe-Mn crust. Serpentinite fragments 7x2 cm in planar size associated with lithoclasts (2x1cm) of diabasic rocks	x (1xSAS)							
SO249-DR45-9	1. Rock Type: intrusive, pyroxenite, altered 2. Size: 19x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: medium to coarse grained 6. Phenocrysts: Px (~5mm, 50%), Amph? (2mm, 3%), Mica (1mm, 1%) 8. Secondary Minerals: white veins throughout the sample 9. Encrustations: Mn crust 10. Comment: -9 and -10 are group of pyroxenites	x	x						
SO249-DR45-10	1. Rock Type: intrusive, pyroxenites, less altered than -9 but still altered 2. Size: 12x11x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: coarse grained 6. Phenocrysts: Px (~5mm, >50%) 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (<1mm)	x							
SO249-DR45-11	1. Rock Type: intrusive, altered gabbro 2. Size: 20x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-black 5. Texture / Vesicularity: phaneritic 6. Phenocrysts: Plg (55%, 3mm), Amph (30%, 2mm), Muscovite (1%, 1mm) 7. Matrix: 8. Secondary Minerals: white vein and red alteration halo (~1cm) 9. Encrustations: Mn crust 10. Comment: samples -11 to -14 are a group of gabbros	x							
SO249-DR45-12	1. Rock Type: intrusive, sheared gabbro 2. Size: 16x12x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: black & white 5. Texture / Vesicularity: phaneritic 6. Phenocrysts: Plg (50%, 5mm), Px (20%, 5mm), Amph (30%, 5mm) 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (2mm)								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-13	1. Rock Type: intrusive, gabbro 2. Size: 13x8x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey back 5. Texture / Vesicularity: phaneritic 6. Phenocrysts: Plg (60%, 5mm), Px (10%, 2mm), Muscovite (2%, 5mm), Amph (~30%, 3mm) 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (~1mm)								
SO249-DR45-14	1. Rock Type: intrusive, gabbro 2. Size: 37x30x18 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey black 5. Texture / Vesicularity: phaneritic 6. Phenocrysts: Plg (60%, 2mm), Px (35%, 2mm) Amph (5%, 1mm) 9. Encrustations: Mn crust (<1mm)								
SO249-DR45-15	1. Rock Type: intrusive, diabase 2. Size: 25x15x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (30%, 1mm), Px (40%, 1mm), Amph (30%, ~1mm) 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (1mm) 10. Comment: sample -15 to -20 are a group of diabasic rocks which could be from the sheeted dike complex	x	x	Plg and Amph if confirmed					
SO249-DR45-16	1. Rock Type: intrusive, diabase 2. Size: 24x20x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (30%, 1mm), Amph (30%, 1mm), Px (40%, 1mm) 8. Secondary Minerals: white veins 9. Encrustations: Mn crust and semiconsolidated, poorly sorted sediment crust			Plg and Amph if confirmed					
SO249-DR45-17	1. Rock Type: intrusive, diabase 2. Size: 37x23x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (40%, 1mm), Amph (20%, 1mm), Px (40%, 1mm) 8. Secondary Minerals: white veins, some Plg is altered orange yellow 9. Encrustations: Mn crust (<1mm)	x	x	Plg and Amph if confirmed					
SO249-DR45-18	1. Rock Type: intrusive, diabase 2. Size: 16x11x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (30%, 1mm), Px (40%, 1mm), Amph (30%, 1mm) 8. Secondary Minerals: white veins and some partially filled fractures with white crystals 9. Encrustations: Mn crust (<1mm)	x	x	Plg and Amph if confirmed					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-19	1. Rock Type: intrusive, diabase 2. Size: 18x13x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (40%, 1mm), Px (50%, 1mm), Amph (10%, 1mm) 8. Secondary Minerals: white and light green veins 9. Encrustations: on one side of the rock there is a poorly sorted sediment crust that has angular clasts. There is also Mn crust (<1mm).	x	x	Plg and Amph if confirmed					
SO249-DR45-20	1. Rock Type: intrusive, diabase 2. Size: 14x12x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: phaneritic, fine grained 6. Phenocrysts: Plg (40%, 1mm), Px (30%, 1mm), Amph (30%, 1mm) 8. Secondary Minerals: An aphyric basalt vein (2cm) cuts through the rock. White veins cut the diabase and basalt vein. Most Plg is altered on rims (orange) 9. Encrustations: Mn crust (<1mm)	x							
SO249-DR45-21	1. Rock Type: volcanic, Ol-basalt 2. Size: 11x9x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Ol (7%, 2mm), altered to iddingsite 7. Matrix: fine grained, Plg and Ol 8. Secondary Minerals: Ol altered to iddingsite. Alteration halo ~2mm 9. Encrustations: Mn crust (<1mm) 10. Comment: samples -21 and -22 are Ol-basalt	x	x						
SO249-DR45-22	1. Rock Type: volcanic, Ol-basalt 2. Size: 18x15x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Olivine (7%, 1mm), altered to iddingsite 7. Matrix: fine grained, Plg and Ol 8. Secondary Minerals: Ol altered to iddingsite. 9. Encrustations: Mn crust (<1mm)	x	x						
SO249-DR45-23	1. Rock Type: volcanic 2. Size: 17x15x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, dense 6. Phenocrysts: Plg (15%, 4mm), Amph? (1%, 1mm) 7. Matrix: fine grained Plg and Amph 8. Secondary Minerals: white veins, red brown alteration of some Amph and groundmass 9. Encrustations: Mn crust (~1mm) 10. Comment: samples -23 to -25 are similar Plg phyric basalts	x	x				MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-24	1. Rock Type: volcanic 2. Size: 12x10x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, dense 6. Phenocrysts: Plg (10%, 3mm), Amph? (1%, 2mm) 7. Matrix: fine grained Plg, Px and Amph 8. Secondary Minerals: white veins, red brown alteration of some Amph and groundmass 9. Encrustations: Mn crust (~1mm)	x	x						
SO249-DR45-25	1. Rock Type: volcanic 2. Size: 9x9x9 cm 3. Shape / Angularity: sub- angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, dense 6. Phenocrysts: Plg (7%, 3mm) 7. Matrix: fine grained Plg and Px 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (~1mm)	x	x	x?					
SO249-DR45-26	1. Rock Type: volcanic 2. Size: 20x9x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphanytic 8. Secondary Minerals: white veins and areas of greenish white prismatic crystals that are connected to the veins. Some patches of brown alteration 9. Encrustations: Mn crust (~1mm) 10. Comment: samples -26 and -27 are similar aphyric lavas	x	x	x?			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR45-27	1. Rock Type: volcanic 2. Size: 10y9x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (<1mm)	x	x						
SO249-DR45-28	1. Rock Type: volcanic 2. Size: 15x13x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2%, 4mm) 7. Matrix: fine grained, Plg 8. Secondary Minerals: white veins 9. Encrustations: Mn crust (≤2mm)	x	x						
SO249-DR45-29	1. Rock Type: volcanic 2. Size: 16x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: pink 5. Texture / Vesicularity: porpyritic 6. Phenocrysts: Plg (20%, 1mm), Px (7%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: some Plg is altered orange 9. Encrustations: Mn crust (≤1mm)	x	x	x					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-30	1. Rock Type: metamorphic, amphibolite 2. Size: 48x37x22 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-black 5. Texture / Vesicularity: foliated 6. Phenocrysts: Amph (~3mm) 8. Secondary Minerals: Fe-Mn crust (≤2mm)	x	x	x (Amph)					
SO249-DR45-31	1. Rock Type: polymict breccia 2. Size: 14x9x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: tan and grey 5. Texture / Vesicularity: poorly sorted with angular clasts up to pebble size 9. Encrustations: Mn crust (2mm)	x	x						
SO249-DR45-32	1. Rock Type: polymict breccia 2. Size: 10x8x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: light purple 5. Texture / Vesicularity: poorly sorted with angular clasts up to pebble size 8. Secondary Minerals: red brown alteration halo along fractures 9. Encrustations: Mn crust (≤1mm)								
SO249-DR45-33	1. Rock Type: claystone 2. Size: 10x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey 5. Texture / Vesicularity: well sorted clay 9. Encrustations: Mn crust (≤5mm)								
SO249-DR45-34	1. Rock Type: Mn crust 2. Size: 22x12x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: black 5. Texture / Vesicularity: contains subrounded to angular clasts								
SO249-DR45-35X	1. Rock Type: like -26 to -27 2. Size: 17x17x10 cm								
SO249-DR45-36X	1. Rock Type: like -15 to -20 2. Size: 13x13x7 cm								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR45-37X	1. Rock Type: like -21 & -22 2. Size: 14x11x9 cm								
SO249-DR45-38X	1. Rock Type: like 15 to 20 2. Size: 15x9x7 cm								no picture taken
SO249-DR45-39X	1. Rock Type: intrusive, altered sepentinite 2. Size: 5x4x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brown with yellowish reddish spots 5. Texture / Vesicularity: protogranular 8. Secondary Minerals: serpentinized peridotite 9. Encrustations: thin Mn crust								no picture taken
SO249-DR45-40X	1. Rock Type: intrusive, altered serpentinite, strongly altered, probably with Qtz 2. Size: 7x5x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: yellowish reddish to dark grey 5. Texture / Vesicularity: protogranular 8. Secondary Minerals: serpentinized peridotite and silicified with Qtz? veins 9. Encrustations: none to very minor								no picture taken
SO249-DR45-41X	1. Rock Type: intrusive, altered serpentinite 2. Size: 4x3x2 cm 3. Shape / Angularity: subangular 4. Color of cut surface: orange color with dark brown veins grey 5. Texture / Vesicularity: protogranular 9. Encrustations: thin Mn crust. Possibly the veins are filled with Mn								no picture taken
SO249-DR45-42X	1. Rock Type: volcanic, Ol basalt 2. Size: 6x6x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Ol (40%) 7. Matrix: fine grained 8. Secondary Minerals: highly altered Ol 9. Encrustations: very thin Mn-crust								no picture taken
SO249-DR45-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR46

Stalemate Fracture Zone. Western slope in the deeper part of the fracture zone

Dredge on bottom UTC 23/06/16 03:21hrs, lat 52°42.09'N, long 169°42.96'E, depth 6641 m
Dredge off bottom UTC 23/06/16 06:36hrs, lat 52°42.04'N, long 169°42.96'E, depth 6432 m
total volume: empty, dredge hung up at the begining of the track and could only be released away from the slope
Comments:

SO249-DR46-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR47

Top region of NNW-SSE striking Stalemate Ridge. Track across N-S striking fault line along eastward dipping slope throughout its entire length

Dredge on bottom UTC 23/06/16 15:31hrs, lat 52°28.95'N, long 169°39.63'E, depth 3429 m
Dredge off bottom UTC 23/06/16 17:01hrs, lat 52°28.88'N, long 169°38.92'E, depth 3050 m
total volume: 1/4 full
Comments: Well solidified conglomerates, sandstones, separate pebbles and subangular fragments of igneous rocks. Predominantly websterites and pyroxenites (~60-70%). ~10-15% gabbro including tectonized varieties and basaltic pebbles.
Most important observations: Lithological types of rocks found in the angular blocs and in pebbles and smaller grains in conglomerates appear to be identical. This indicates insitu origin of the conglomerates, which can represent beach deposits. This is consistent with the hypothesis that the N part of Stalemate FZ was exposed above sealevel.
Geochemical studies: Gabbro and basaltic pebbles seem to be very good for geochemistry and for Ar-Ar dating (-17 to -25). Geochemical pieces were also taken from abundant pyroxenites and websterites. Inspection of thin sections of sandstones and conglomerates is important to prove their insitu origin. Although this is quite evident because of the presence of bastite in sandstone but still has to be proved by photomicrograph and perhaps chemical / mineralogical data. It should be explored if the age of the beach deposits could be dated by fossils.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-1	1. Rock Type: intrusive; websterite or Ol-websterite 2. Size: 12x11x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey + reddish spots referred to as altered Ol 5. Texture / Vesicularity: proto-intra-granular 7. Matrix: medium-coarse grained and made of Serpentine + (OPx + CPx) --> ~70% + Ol ~10% replaced by Fe-oxide 8. Secondary Minerals: degree of serpentinization 30-40% 9. Encrustations: oxidized crust ≤ 2mm 10. Comment: Px geochemistry	x (1x SAS)	x						
SO249-DR47-2	1. Rock Type: intrusive; Ol-websterite, strongly altered 2. Size: 20x10x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey + reddish spots of altered Ol 5. Texture / Vesicularity: protogranular 7. Matrix: medium-coarse grained. Matrix; Serpentine (40%) + (OPx) --> ~60% + Ol replaced by Fe-oxides --> 5-7%, CPx ≤ 5% 8. Secondary Minerals: serpentine + Fe oxides 9. Encrustations: oxidized crust ≤ 2mm 10. Comment: OPx geochemistry	x (1x SAS)	x						

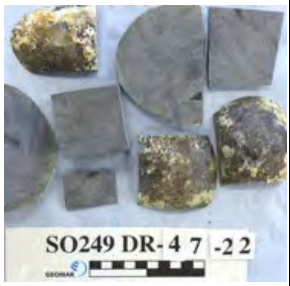
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-3	1. Rock Type: intrusive; websterite, strongly altered 2. Size: 15x12x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey + reddish spots after altered Ol 5. Texture / Vesicularity: protogranular 7. Matrix: coarse grained. OPx (30-40%), CPx ≤5%, serpentine ~50%, Fe oxides 8. Secondary Minerals: serpentine + Fe oxides 5% 10. Comment: OPx geochemistry	x (1x SAS)	x						
SO249-DR47-4	1. Rock Type: intrusive, pyroxenite? 2. Size: 12x8x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-bluish 5. Texture / Vesicularity: granular 7. Matrix: medium grained matrix Opx (40%) + Cpx (10%) + Serpentine 8. Secondary Minerals: Serpentine; medium degree of serpentinization 9. Encrustations: no crust 10. Comment: OPx geochemistry	x (1x SAS)	x						
SO249-DR47-5	1. Rock Type: intrusive, pyroxenite, low degree of alteration 2. Size: 9x7x6 cm 10. Comment: otherwise similar as -4	x (1x SAS)	x						
SO249-DR47-6	1. Rock Type: between Ol websterite and websterite and harzburgite. High degree of serpentinization 2. Size: 17x11x8 cm 9. Encrustations: Fe-Mn crust 2-3mm, contact with lithoclastic breccia (highly tectonized)	x (1x SAS)	x						
SO249-DR47-7	1. Rock Type: intrusive, dunite (?) 2. Size: 17x13x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey greenish 5. Texture / Vesicularity: protogranular 7. Matrix: fine grained, there are almost no primary minerals, only serpentine visible 8. Secondary Minerals: serpentine + magnetite 9. Encrustations: none	x (1x SAS)	x						
SO249-DR47-8	1. Rock Type: intrusive, dunite (?), strongly serpentinized 2. Size: 16x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: protogranular 7. Matrix: fine grained, no visible primary minerals; maybe spinel and Opx 8. Secondary Minerals: serpentine; magnetite 9. Encrustations: none	x (1x SAS)	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-9	1. Rock Type: intrusive, dunites (?) 2. Size: 18x11x6 cm 10. Comment: otherwise simlar to -7 and -8	x (1x SAS)	x						
SO249-DR47-10	1. Rock Type: intrusive, dunite (?) 2. Size: 11x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green with reddish spots of altered Ol 5. Texture / Vesicularity: protogranular 7. Matrix: fine grained, no primary minerals visible, maybe spinel 8. Secondary Minerals: Serpentine + Magnetite 9. Encrustations: Fe-Mn crust ~2-3mm	x (1x SAS)	x						
SO249-DR47-11	1. Rock Type: intrusive, tectonized ultramafics 2. Size: 12x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: protogranular, slightly banded 7. Matrix: fine grained, no primary minerals 8. Secondary Minerals: Serpentine + Magnetite ± Chl 9. Encrustations: Fe-Mn crust ≤ 3mm	x (1x SAS)							
SO249-DR47-12	1. Rock Type: intrusive, tectonized ultramafics 2. Size: 33x21x10 cm from boulder L 3. Shape / Angularity: angular 4. Color of cut surface: green 5. Texture / Vesicularity: granular, banded	x (1x SAS)							
SO249-DR47-13	1. Rock Type: intrusive, tectonized ultramafics 2. Size: 13x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: protogranular, slightly banded 8. Secondary Minerals: serpentine + magnetite + clay minerals 9. Encrustations: Fe-oxide crust ≤2mm	x (1x SAS)							
SO249-DR47-14	1. Rock Type: intrusive, possible contact between pyroxenite and dunite vein, strongly altered 2. Size: 22x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey / pale grey along contact zone 5. Texture / Vesicularity: proto granular 7. Matrix: fine grained, no primary minerals visible 8. Secondary Minerals: serpentine + magnetite + clay minerals 9. Encrustations: none	x (1x SAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-15	1. Rock Type: intrusive, perhaps contact between dunite vein & pyroxenite 2. Size: 14x10x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey / pale grey 5. Texture / Vesicularity: protogranular 7. Matrix: fine grained, no primary minerals 8. Secondary Minerals: serpentine + magnetite 9. Encrustations: thin Fe-Mn crust (<2mm)								
SO249-DR47-16	1. Rock Type: intrusive; possible contact between dunite vein and host pyroxenite 2. Size: 17x13x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale grey / pale green 5. Texture / Vesicularity: protogranular 7. Matrix: fine grained, no primary minerals 8. Secondary Minerals: serpentine + magnetite + chlorite + clay minerals 9. Encrustations: Fe-Mn crust ~2mm	x (1x SAS)	x						
SO249-DR47-17	1. Rock Type: intrusive, gabbro, low degree of alteration 2. Size: from big boulder T; 30x18x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: green 5. Texture / Vesicularity: granoblastic 7. Matrix: medium coarse grained Px (~60-70%) + Plg (≤30%) 8. Secondary Minerals: relatively fresh rock ± Chl ± Actinolite 9. Encrustations: no crust 10. Comment: Plg good for Ar/Ar dating	x (1x SAS)	x						
SO249-DR47-18	1. Rock Type: intrusive, gabbro 2. Size: 24x14x7 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: granoblastic 7. Matrix: medium grained OPx (10%) + Cpx (40%) + Plg (40%) ± secondary minerals 8. Secondary Minerals: Actinolite + Chl 9. Encrustations: no crust								
SO249-DR47-19	1. Rock Type: intrusive; classic(!), gabbro, medium grade of alteration 2. Size: 12x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale blue 5. Texture / Vesicularity: gabbro - ophytic 7. Matrix: coarse grained, OPx (5%) + Plg (50%) + CPx (30%) + secondary minerals 8. Secondary Minerals: Actinolite + Chl 9. Encrustations: no crust 10. Comment: Plg good for Ar/Ar	x (1x SAS)	x	Plg					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-20	1. Rock Type: intrusive; same gabbro type as -19; medium degree of alteration 2. Size: 14x9x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale blue / grey 5. Texture / Vesicularity: gabbro-ophytic 7. Matrix: coarse grained; OPx (5%) + Plg (50%) + CPx (30%) + secondary minerals 8. Secondary Minerals: Actinolte + Chl (?) 9. Encrustations: no crust 10. Comment: Plg good for dating	x	x	Plg					
SO249-DR47-21	1. Rock Type: volcanic, basalt / dolerite 2. Size: 14x11x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric / aphyric 7. Matrix: fine grained; Px (50-60%) + Plg (40-50%) make up groundmass 8. Secondary Minerals: Chl (?) 9. Encrustations: Fe-Mn crust ≤3mm	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR47-22	1. Rock Type: volcanic; basalt (Px-phyric), low degree of alteration 2. Size: 14x12x9 cm 3. Shape / Angularity: rounded (pebble) 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric (no vesicles) 6. Phenocrysts: 10% Px + Plg in groundmass 7. Matrix: fined grained 8. Secondary Minerals: ± Chl 9. Encrustations: none 10. Comment: Plg good for Ar/Ar dating	x	x	Plg					
SO249-DR47-23	1. Rock Type: volcanic; diabase, low degree of alteration 2. Size: 14x11x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: doleritic, aphyric 7. Matrix: fine grained, Px + Plg in groundmass 8. Secondary Minerals: ± Chl 9. Encrustations: no crust	x	x						
SO249-DR47-24	1. Rock Type: volcanic, diabase, low degree of alteration 2. Size: 14x10x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained; Ol (5%) + Px & Plg in groundmass 8. Secondary Minerals: ±Chl, ± Actinolite 9. Encrustations: no crust								
SO249-DR47-25	1. Rock Type: volcanic, diabase, low degree of alteration 2. Size: 16x24x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: sub-doleritic 7. Matrix: fine grained Px+Plg in groundmass 8. Secondary Minerals: Chl + Actinolite 9. Encrustations: no crust								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-26	1. Rock Type: sediment, tectonized conglomerate, altered 2. Size: 16x12x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale green / dark grey 5. Texture / Vesicularity: cataclastic 7. Matrix: very fine tectonized matter 8. Secondary Minerals: Chl + clay minerals 9. Encrustations: no crust	x (1x SAS)							
SO249-DR47-27	1. Rock Type: sedimentary; polymict breccia 2. Size: 17x13x6 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: brecciated clastic 7. Matrix: coarse grained 8. Secondary Minerals: Chl + Clay minerals 9. Encrustations: no crust	x (1x SAS)							
SO249-DR47-28	1. Rock Type: sediment, sandstone 2. Size: 20x11x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: brownish green 5. Texture / Vesicularity: sandy clastic 7. Matrix: medium grained 8. Secondary Minerals: different layered clay minerals (low temperature)	x (1x SAS)							
SO249-DR47-29A	1. Rock Type: intrusive, Ol-websterite 2. Size: 6x5x3 cm 3. Shape / Angularity: rounded, small pebbles 4. Color of cut surface: grey with reddish points (Ol) 5. Texture / Vesicularity: protogranular 7. Matrix: coarse grained. Opx (5%), Cpx (50-60%), serpetinite 8. Secondary Minerals: serpentinite	x (1x SAS)							
SO249-DR47-29B	1. Rock Type: intrusive, gabbro 2. Size: 15x10x9 cm 3. Shape / Angularity: rounded pebbles 4. Color of cut surface: pale grey 5. Texture / Vesicularity: gabbroic, ophytic 7. Matrix: coarse grained. Px (50%), Pl (50%) 8. Secondary Minerals: Act	x (1x SAS)							
SO249-DR47-29C	1. Rock Type: intrusive, websterite 2. Size: 10x7x5 cm 3. Shape / Angularity: rounded, small pebbles 4. Color of cut surface: dark grey 5. Texture / Vesicularity: protogranular 7. Matrix: coarse grained								
SO249-DR47-29D	1. Rock Type: intrusive / volcanic, diabase 2. Size: 5x4x3 cm 3. Shape / Angularity: rounded, small pebbles								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-29E	1. Rock Type: intrusive / volcanic, diabase 2. Size: 5x4x3 cm 3. Shape / Angularity: rounded, small pebbles								
SO249-DR47-29F	1. Rock Type: intrusive / volcanic, diabase 2. Size: 5x4x3 cm 3. Shape / Angularity: rounded, small pebbles								
SO249-DR47-30	1. Rock Type: sediment or weathering crust 2. Size: 20x15x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: yellow green 7. Matrix: coarse grained. Composed mostly of clasts of Opx crystals 8. Secondary Minerals: clay minerals, possibly a weathered crust after orthopyroxenite 9. Encrustations: Fe-Mn crust >2.5cm								
SO249-DR47-31X	1. Rock Type: Intrusive gabbro from big boulder (T) DR47-7 2. Size: 15x15x12 cm								no picture taken
SO249-DR47-32X	1. Rock Type: intrusive, dunite, similar to 47-7 through 47-10 2. Size: 7x7x4 cm								
SO249-DR47-33X	1. Rock Type: intrusive, dunite. Imilar to 47-7 through 47-10 2. Size: 12x10x6 cm								
SO249-DR47-34X	1. Rock Type: intrusive, Ol-websterite 2. Size: 10x8x4 cm								
SO249-DR47-35X	1. Rock Type: intrusive, dunite. Similar to 47-7 through 47-10 2. Size: 10x7x7 cm								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR47-36X	1. Rock Type: intrusive, Ol-websterite 2. Size: 13x9x8 cm								
SO249-DR47-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR48

Attu Canyons. S end of SW striking ridge, south from Attu Island. South facing slope / scarp. Dredge track is oblique to the slope

Dredge on bottom UTC 24/06/16 02:12hrs, lat 52°36.32'N, long 171°23.97'E, depth 3815 m
Dredge off bottom UTC 24/06/16 03:22hrs, lat 52°36.27'N, long 171°23.18'E, depth 3493 m
total volume: 1/4 full
Comments: Mainly sediments. Two Plg-Amph phyric lava fragments. Conclusion: Site only good for reconaissance

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR48-1	1. Rock Type: volcanic 2. Size: 15x11x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Amph (10%, 1mm), Plg (1%, 1mm) 7. Matrix: fine grained Plg 10. Comment: check Amph for possible Ar-Ar dating	x	x	x?			MSC_GW	out	
SO249-DR48-2	1. Rock Type: volcanic 2. Size: 6x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (25%, 2mm), Amph (1%, 1mm), 7. Matrix: fine grained, Plg 10 Comments: 1.5cm alteration halo, check Plg for possible Ar-Ar dating	x					MSC_GW	TS by Airfreight, GC taken out	
SO249-DR48-3	1. Rock Type: sedimentary, sandstone 2. Size: 10x8x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: fine to medium grained sand								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR48-4	1. Rock Type: sedimentary 2. Size: 15x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greyish tan 5. Texture / Vesicularity: sorted silt 8. Secondary Minerals: white veins								
SO249-DR48-5	1. Rock Type: sedimentary, mudstone 2. Size: 12x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish tan 5. Texture / Vesicularity: well sorted mud 8. Secondary Minerals: few white veins and some red-brown oxidation spots								
SO249-DR48-6	1. Rock Type: sedimentary, sandstone 2. Size: 17x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey + brown 5. Texture / Vesicularity: well sorted fine grained sand 8. Secondary Minerals: white veins, alteration rind, dendritic Mn								
SO249-DR48-7	1. Rock Type: semi consolidated mud 2. Size: 11x9x8 cm								
SO249-DR48-8X	1. Rock Type: similar to -2 2. Size: 8x6x4 cm								
SO249-DR48-9X	1. Rock Type: similar to -3 & -6 2. Size: 8x5x4 cm and 8x6x5 cm								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR48-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR49

Attu Canyons. Entrance of canyon beneath eastern Attu. SE facing slope upper section, across possible NE-SW striking fault

Dredge on bottom UTC 24/06/16 11:37hrs, lat 52°16.92'N, long 172°16.55'E, depth 3716 m
Dredge off bottom UTC 24/06/16 13:04hrs, lat 52°17.35'N, long 172°16.16'E, depth 3307 m

total volume: 1/2 full

Comments: Mostly mud with rounded fragments of semi-consolidated sediment (mudstone) and a few clasts of porphyric volcanics. They are mostly very strongly rounded. -1 is a subangular Ol-phyric lava fragment indicating least transportation. Conclusion: Igneous rocks are only good for reconaissance and difficult to interpret without ages

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR49-1	1. Rock Type: volcanic, moderately fresh 2. Size: 9x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, at cracks slightly brownish 5. Texture / Vesicularity: porphyric, dense (no vesicles) 6. Phenocrysts: Fsp (sub-mm to 2mm, 7-10%), black minerals (Amph?, sub-mm, 3-5%) 7. Matrix: fine grained 9. Encrustations: thin coating 10. Comment: coating could be removed from GC slab only partially, be careful at picking chips	x	x				MSC_GW	TS by Airfreight, GC taken out	
SO249-DR49-2	1. Rock Type: volcanic, moderately fresh 2. Size: 15x11x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey, slightly greenish, some very small parts brownish 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: black minerals Px/Amph?, 1-2mm, 15%, Fsp, 1-2mm, 7% 7. Matrix: fine grained matrix 9. Encrustations: thin coating 10. Comment: sample is different from -1 but also more rounded	x	x				MSC_GW	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR49-3	1. Rock Type: volcanic, moderately fresh 2. Size: 10x6x5 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: medium grey, some slight brownish parts 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: Fsp (1-4mm, 15-20%), black minerals (sub-mm, 3%) 7. Matrix: fine grained matrix 8. Secondary Minerals: golden brown fillings in some places (pyrite) 9. Encrustations: thin Mn-coating 10. Comment: sample small and rounded, indicating long distance transport or ice rafted origin	x							
SO249-DR49-4	1. Rock Type: volcanic, moderately fresh 2. Size: 8x7x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, few brownish parts 5. Texture / Vesicularity: porphyric dense 6. Phenocrysts: black minerals, sub-mm to 2mm, Px, Amph?, 10%; Fsp small sub-mm needles, 5% 7. Matrix: fine grained matrix 9. Encrustations: thin coating 10. Comment: sample has similarities to sample -2 but smaller minerals	x							
SO249-DR49-5	1. Rock Type: volcanic, moderately fresh 2. Size: 5x4x2 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medim grey 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: black minerals (Px / Amph?), 1-3mm, 10%; Fsp 1-3mm, 5% 7. Matrix: fine grained 9. Encrustations: thin Mn-coating 10. Comment: simiar to -2 and -4	x							
SO249-DR49-6	1. Rock Type: volcaniclastic 2. Size: 8x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey, white vesicle filling, greenish alteration part 5. Texture / Vesicularity: one large and one smaller clast, white Cc filling of vesicles, green alteration, because of fluid movement?. At one side hypidiomorphic minerals (Amph?) 7. Matrix: fine grained 8. Secondary Minerals: Cc filling of vesicles 10. Comment: difficult to describe the greenish alteration part and the hypidiomorphic minerals								
SO249-DR49-7	1. Rock Type: volcanic, moderately fresh 2. Size: 5x4x2 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: black minerals (Px / Amph?), 1-2mm, 7%; Fsp, 3-5mm, 10% 7. Matrix: fine grained 10. Comment: similar to -2, -4, -5								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR49-8	1. Rock Type: sediment 2. Size: 12x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: small grained, well sorted sediment with few black larger grains. White veins show slight foliation or lamination, veins cross-cut black grains 10. Comment: veins may show metamorphic overprint								
SO249-DR49-9	1. Rock Type: sediment, breccia 2. Size: 14x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey and brownish matrix, white clasts 5. Texture / Vesicularity: white angular clasts in a fine matrix, some vesicles, poorly sorted sediment 7. Matrix: fine grained 8. Secondary Minerals: some greenish vesicle filling								
SO249-DR49-10	1. Rock Type: sediment 2. Size: 11x6x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brown, some greyish parts 5. Texture / Vesicularity: fine laminated sandstone, some coarser and finer layers. Rock is tectonized, grey veins cross-cut the lamination 8. Secondary Minerals: grey veins								
SO249-DR49-11	1. Rock Type: semi-consolidated mud 2. Size: 12x8x5 cm 3. Shape / Angularity: rounded 10. Comment: sample represents most of the dredged rocks, unconsolidated to semiconsolidated mud								
SO249-DR49-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR50

Attu Canyons. ~8km NE of DR49 along NE dipping slope from bottom to ridge

Dredge on bottom UTC 24/06/16 16:50hrs, lat 52°19.98'N, long 172°22.54'E, depth 3713 m

Dredge off bottom UTC 24/06/16 18:22hrs, lat 52°19.65'N, long 172°22.38'E, depth 3317 m

total volume: 1/4 full

Comments: Mostly semi-consolidated mudstones, sandstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR50-1	1. Rock Type: sedimentary, muddy sandstone 2. Size: 23x15x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish green grey 5. Texture / Vesicularity: fine to medium sand with a muddy matrix 6. Phenocrysts: Qtz, medium grained sand; Fsp, medium grained sand, mafic minerals, fine sand								
SO249-DR50-2	1. Rock Type: sedimentary, mudstone 2. Size: 22x15x10 cm 3. Shape / Angularity: subrounded to subangular 4. Color of cut surface: greenish grey brown 5. Texture / Vesicularity: silt clay, highly fractured into blocky angular fragments ranging from ~1mm to 40mm. Fragments are cemented together but have large voids inbetween 8. Secondary Minerals: reddish brown alteration rim up to ~2cm								
SO249-DR50-3	1. Rock Type: sedimentary, conglomerate 2. Size: 25x19x14 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey , brown, greenish grey 5. Texture / Vesicularity: basalt (?), cobbles ~7-8cm held togehther by muddy matrix. Some fine medium sand in matrix. Matrix is greenish to reddish brown. Cobbles are dark grey, some parts altered to red brown and are subrounded to subangular								
SO249-DR50-4	1. Rock Type: sedimentary, semi-consolidated mud / sand 2. Size: 19x13x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish green, dark geyish 5. Texture / Vesicularity: muddy sand or sandy mud. 40-50% fine medium sand, rest is muddy matrix								
SO249-DR50-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR51

Aleutian slope SW of Attu. NE shallow slope

Dredge on bottom UTC 25/06/16 01:52hrs, lat 52°15.60'N, long 172°58.20'E, depth 1512 m

Dredge off bottom UTC 25/06/16 03:24hrs, lat 52°15.92'N, long 172°58.62'E, depth 1099 m

total volume: 1/4 full

Comments: Brecciated aphyric lava fragments (-1 to -8) along with Plg + Amph or Px phyric lavas (-9 to -11). Minor diabasic rocks (-16), volcaniclastics and sediments. Pillow lava fragments in -18x. Overall dregde provides a large variety of aphyric and Plg-Amph-Px phyric lavas. Age dating required to align with overall stratigraphy.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR51-1	1. Rock Type: brecciated basalt (angular clasts, no transportation) 2. Size: 20x18x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey, with darker greenish grey veins 5. Texture / Vesicularity: aphyric, vesicles in some part of the rock; 1% mostly filled with white material, 1-2mm. A lot of veins mostly filled with greyish green white material. 7. Matrix: fine grained grey matrix 8. Secondary Minerals: white filling of vesicles --> no Cc as no fizzing with HCl. 10. Comment: greenish veins should be avoided	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR51-2	1. Rock Type: brecciated basalt (bigger clasts than in sample -1) 2. Size: 16x14x11 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey with reddish brown veins 5. Texture / Vesicularity: aphyric, vesicles <1%, -1mm & white filling. Less veins than in -1 7. Matrix: fine grained dark matrix 8. Secondary Minerals: white red brown dark grey filling of cracks 10. Comment: see sample -1	x	x						
SO249-DR51-3	1. Rock Type: brecciated basalt 2. Size: 15x10x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey with reddish brown veins & white veins 5. Texture / Vesicularity: aphyric, no vesicles, veins partly opened up to 2mm 7. Matrix: fine grained 8. Secondary Minerals: red filling of veins, sometimes altered matrix next to it as a reddish brown rim	x	x						
SO249-DR51-4	1. Rock Type: brecciated basalt 2. Size: 15x11x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-medium grey with white & red veins --> bigger veins through in samples -2 & -3 5. Texture / Vesicularity: aphyric, no vesicles, veins up to 5mm 7. Matrix: fine grained 8. Secondary Minerals: red & white fillings of veins 10. Comment: larger & very red veins than sample -2 & -4	x	x						
SO249-DR51-5	1. Rock Type: brecciated basalt (less veins) 2. Size: 9x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey with beige parts 5. Texture / Vesicularity: aphyric, black minerals ---> round, ø 1mm, <1mm 7. Matrix: medium grained matrix 8. Secondary Minerals: veins, sometimes filled with orange-oxidized material & sometimes not filled --> maybe two crack generations 10. Comment: different from -1 to -4	x	x				MSC_GW	TS by Airfreight, GC taken out	

SO249-DR51-6	1. Rock Type: brecciated basalt 2. Size: 19x13x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey with light and dark grey filled veins up to 3mm wide 5. Texture / Vesicularity: aphyric 7. Matrix: medium grained matrix with black minerals as dots 8. Secondary Minerals: veins filled with grey light blue material 10. Comment: see sample -1	x	x						
SO249-DR51-7	1. Rock Type: brecciated 2. Size: 13x9x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey with black minerals and white dark grey filled fractures 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained matrix with black minerals (Amph?) 8. Secondary Minerals: veins mostly filled with white - dark grey mineral 10. Comment: see sample -1	x	x						
SO249-DR51-8	1. Rock Type: volcanic 2. Size: 13x12x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey with green & black phenocrysts 5. Texture / Vesicularity: porphyric 6. Phenocrysts: green = CPx (10-15%, 3-9mm) Amph (10-15%, 1-9 mm) 7. Matrix: fine grained matrix with black minerals 8. Secondary Minerals: none 10. Comment: loads of crystals; pretty fresh rock	x	x						
SO249-DR51-9	1. Rock Type: volcanic 2. Size: 11x11x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey with blue minerals 5. Texture / Vesicularity: porphyric 6. Phenocrysts: black (Amph?, 1-3mm, 5-7%), whitish-blue (Plg?, 3-10mm, 5-7%) 7. Matrix: fine grained matrix	x	x						
SO249-DR51-10	1. Rock Type: volcanic 2. Size: 10x10x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium-dark grey with black menerals & back-white-blue-green vesicle fillings 5. Texture / Vesicularity: porphyric, vesicle mostly filled 6. Phenocrysts: black (Amph?, 1-2mm, 15-20%) 7. Matrix: fine grained matrix 8. Secondary Minerals: white filled veins, vesicles 3-5%, mostly filled 10. Comment: interesting vesicle filling	x	x						
SO249-DR51-11	1. Rock Type: volcanic or diabasic, fresh 2. Size: 10x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium dark grey 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Amph(5%, ~1mm), Plg (5-7%, ~4mm), CPx (?) (1%, 2-3mm) 7. Matrix: fine, Plg+Amph in groundmass 8. Secondary Minerals: some minor sulfide replacement	x	x				MSC_GW	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR51-12	1. Rock Type: volcaniclastic 2. Size: 23x22x27 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light medium grey, bluish grey 5. Texture / Vesicularity: med grained, massive porphyritic 6. Phenocrysts: Px (~15%, ~1mm), Mica (Phlogopite?, 1-3%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: Actinolite, possibly Plg altered to Chl 9. Encrustations: thin Mn coating								
SO249-DR51-13	1. Rock Type: volcanic, fresh 2. Size: 17x14x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark green, dark grey, black 5. Texture / Vesicularity: porhyritic, 7% vesicles 6. Phenocrysts: Px, 1-4mm, 30% 7. Matrix: fine, vesicular, grey portion of rock. Plg + Px 10. Comment: possibly same mineralogy as -12, with different texture	x	x				MSC_GW	TS+GC to GW by Airfreight	
SO249-DR51-14	1. Rock Type: volcaniclastic 2. Size: 12x9x5 cm 3. Shape / Angularity: subangular 10. Comment: otherwise very similar to -12, but slightly smaller grain size and no visible mica								
SO249-DR51-15	1. Rock Type: volcaniclastic breccia 2. Size: 12x12x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: black, dark brown grey, dark greenish 5. Texture / Vesicularity: brecciated-subangular to subrounded clasts of mostly mafic volcanic material, some minor intermediate clasts, 1-15mm 7. Matrix: light colored cements probably siliceous 9. Encrustations: thin Mn-Fe coating								
SO249-DR51-16	1. Rock Type: diabasic 2. Size: 28x14x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey black 5. Texture / Vesicularity: fine grained massive 6. Phenocrysts: rock has a single wavy band of ~1-2mm crystals, band is 1-3mm thick 7. Matrix: fine, Px +Plg 8. Secondary Minerals: Actinolite ± Chl in band of coarse crystals 9. Encrustations: thin Mn-Fe coating 10. Comment: could be flow banding								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR51-17	1. Rock Type: sedimentary 2. Size: 14x10x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greenish, grey, dark, brownish grey 5. Texture / Vesicularity: layered / laminated 7. Matrix: mostly wavy layers of dark greenish grey mud (~1-1.5cm). Thick layer of dark brownish grey mud 9. Encrustations: thin Fe-Mn coating	x							
SO249-DR51-18X	1. Rock Type: pillow lava (?) fragments from volcanic breccia 2. Size: 13x12x9 cm, 11x9x6 cm, 13x11x10 cm 3. Shape / Angularity: subangular 9. Encrustations: thin Fe-Mn crust								
SO249-DR51-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-PF52

Profiling Stalemate Fracture Zone

Profiling Start UTC 25/06/16 14:04hrs, lat 51°38.00'N, long 170°45.00'E, depth 2960 m
Profiling End UTC 26/06/16 01:06hrs, lat 49°59.13'N, long 173°31.45'E, depth 2788 m

Comments: Aim of the mapping was to map out Stalemate FZ in a single swath to connect with SO201 profile and sampling stationSO201 DR7 followed by sampling along ridge towards W in the following days

SO249-DR53

Stalemate Fracture Zone; SE section, ~5nm NNW of SO201-DR7, lower slope

Dredge on bottom UTC 26/06/16 03:34hrs, lat 51°04.73'N, long 173°25.28'E, depth 4095 m
Dredge off bottom UTC 26/06/16 04:57hrs, lat 50°04.64'N, long 173°25.86'E, depth 3708 m
total volume: few rocks
Comments: Only a few Plg phyric lavas recovered. Plg may be good for Ar-Ar age dating

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR53-1	1. Rock Type: volcanic, basalt?, sligtly altered 2. Size: 7x6x2 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium brownish green 5. Texture / Vesicularity: porphyritic, vesicular (1-2m, 2-3%) 6. Phenocrysts: Plg (3-5%, 0.5-2mm), slightly altered 7. Matrix: fine grained; Plg in groundmass 8. Secondary Minerals: alteration halo ~5mm, blueish grey vesicle fill 9. Encrustations: thin Fe-Mn crust 10. Comment: phenocrysts appear altered	x	x	2-3			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR53-2	1. Rock Type: volcanic; basalt, fresh 2. Size: 7x6x2 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium brownish grey 5. Texture / Vesicularity: porphyritic, diabasic 6. Phenocrysts: Ol (5-7%, 0.5-2mm, fresh); Plg (3-5%, 0.5-2mm, fresh) 7. Matrix: fine grained; Plg, diabasic 8. Secondary Minerals: none observed 9. Encrustations: thin Fe/Mn coating 10. Comment: fresh Ol & Plg phenocrysts for geochemistry and Ar/Ar	x	x	1			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR53-3	1. Rock Type: volcanic, basalt, fresh 2. Size: 18x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium brownish grey 5. Texture / Vesicularity: porphyritic, non vesicular 6. Phenocrysts: Px (~10%, 3-10mm, fresh), Plg (5-7%, 2-7mm, fresh) 7. Matrix: fine grained 8. Secondary Minerals: silica, zeolites in veins 9. Encrustations: Fe-Mn cust ~1cm 10. Comment: large fresh phenocrysts	x	x	1			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR53-4	1. Rock Type: volcanic, basalt 2. Size: 10x8x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (1-5mm, 5-7%) 6. Phenocrysts: Plg (7-10%, 1-3mm, slightly altered), Amph? (≤ 1%, ~1mm) 7. Matrix: fine grained 8. Secondary Minerals: zeolites in some vesicles 9. Encrustations: thin Fe-Mn coating 10. Comment: phenocrysts appear altered	x		2					
SO249-DR53-5	1. Rock Type: sedimentary, conglomerate altered 2. Size: 8x6x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg phenocrysts in larger basalt clasts (5-7%, <1mm, altered) 7. Matrix: clasts; basalt, 3-10mm; matrix medium sand 8. Secondary Minerals: none observed 9. Encrustations: thin Fe-Mn crust 10. Comment: extensively fractured, altered								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR53-6	1. Rock Type: sedimentary mudstone 2. Size: 14x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brown - tan 5. Texture / Vesicularity: laminated, bioturbated 7. Matrix: mud some fine sand layers 8. Secondary Minerals: Fe-oxides 9. Encrustations: none 10. Comment: top is a thin (5-10mm) coarse grained tuffaceous (?) layer containing Amph, Plg, Qtz grains 2-5mm. These appear fresh and may be used for Ar-Ar and geochemistry. Layer also contains red lithic fragments.								
SO249-DR53-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR54

Stalemate Fracture Zone; easternmost part of mapped area. NE facing slope of the ridge, ~2.5nm NW of SO201-1b DR7

Dredge on bottom UTC 26/06/16 08:24hrs, lat 50°03.39'N, long 173°30.39'E, depth 3684 m

Dredge off bottom UTC 26/06/16 09:52hrs, lat 50°02.99'N, long 173°29.87'E, depth 3101 m

total volume: 1/2 full

Comments: Mostly aphyric and Plg phyric diabases, one large bloc argillites, few sandstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR54-1	1. Rock Type: volcanic, diabase, fresh 2. Size: 13x7x5cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: diabase, non-vesicular 7. Matrix: fine grained, diabasic, Plg, Amph? 8. Secondary Minerals: brownish red vein fill 9. Encrustations: thin Fe-Mn crust 10. Comment: very fine diabasic texture	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR54-2	1. Rock Type: volcanic, fresh diabase 2. Size: 18x17x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: diabasic, non-vesicuar 7. Matrix: medium grained; Plg, Amph?, possible Ol altered 8. Secondary Minerals: silica, zeolite, Fe-oxide vein fillings, intergrowth 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to -1, slightly coarser grained	x	x	1-2					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR54-3	1. Rock Type: volcanic, diabase, fairly fresh 2. Size: 11x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: diabasic, non-vesicuar 7. Matrix: medium grained; Plg, possible Ol altered 8. Secondary Minerals: zeolite, Fe-oxide fracture fills 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to -2	x	x	1-2					
SO249-DR54-4	1. Rock Type: volcanic, diabase 2. Size: 9x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: diabasic, non-vesicuar 7. Matrix: medium grained; Plg, Amph?, possible Ol altered 8. Secondary Minerals: Qtz vein fill 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to -2 & -3	x	x	1-2					
SO249-DR54-5	1. Rock Type: volcanic, basalt 2. Size: 10x8x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, non-vesicular 7. Matrix: fine grained 8. Secondary Minerals: silica vein fill 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to -1 through -4 but finer grained	x	x	1-2					
SO249-DR54-6	1. Rock Type: volcanic, basalt somewhat altered 2. Size: 13x10x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular 6. Phenocrysts: Ol (0.5-3mm, 7-10%, slightly to very altered), Plg (1-2mm, 3-5%, fresh) 7. Matrix: fine grained 8. Secondary Minerals: light colored vesicle fill 9. Encrustations: thin Fe-Mn coating 10. Comment: degree of Ol alteration is variable	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR54-7	1. Rock Type: volcanic, fairly fresh 2. Size: part of bloc F; 19x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, non-vesicular 6. Phenocrysts: Ol (2-3%, 0.5-2mm), Plg (1-2%, 0.5-3mm) 7. Matrix: fine grained, possible diabasic 8. Secondary Minerals: silica veins 9. Encrustations: thin Fe-Mn coating	x	x	1-2					

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SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR54-8	1. Rock Type: volcanic, fairly altered 2. Size: 22x15x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, non-vesicular 6. Phenocrysts: Ol (7-10%, 1-3mm, altered), Plg (5-7%, 1-2mm, fresh) 7. Matrix: fine grained 8. Secondary Minerals: silic fracture fill 9. Encrustations: thin Fe-Mn coating 10. Comment: similar to -7, coarser grained	x	x	1-2					
SO249-DR54-9	1. Rock Type: volcanic, altered basalt 2. Size: part of bloc G; 19x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, non vesicular 6. Phenocrysts: Ol (2-3%, 1-3mm, altered), Plg (2-3%, 2-4mm, altered) 7. Matrix: fine grained 8. Secondary Minerals: silica fracture fill 9. Encrustations: thin Fe-Mn crust 10. Comment: similar to -7, more fractured	x	x	2-3					
SO249-DR54-10	1. Rock Type: volcanic, altered basalt 2. Size: 14x8x5 cm 3. Shape / Angularity: medium reddish brown 4. Color of cut surface: subrounded 5. Texture / Vesicularity: porphyritic, non-vesicular 6. Phenocrysts: Ol (7-10%, 2-10mm, fresh to altered), Plg (3-5%, 2-8mm, fresh) 7. Matrix: fine grained 8. Secondary Minerals: none observed 9. Encrustations: Mn crust 1-2 mm 10. Comment: some Plg phenocrysts visibly zoned	x	x	1					
SO249-DR54-11	1. Rock Type: volcanic, fresh basalt 2. Size: 18x10x9 cm, part of bloc T 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, non-vesicular 6. Phenocrysts: Plg (10-15%, 1-10mm, fresh) 7. Matrix: medium grained; Plg 8. Secondary Minerals: silica fracture fill 9. Encrustations: thin Fe-Mn coating	x	x	1-2					
SO249-DR54-12	1. Rock Type: sedimentary, mudstone, altered 2. Size: 17x14x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: laminated 7. Matrix: cross laminated mud and silt 8. Secondary Minerals: none observed 9. Encrustations: none 10. Comment: flattened opal rings ~4mm may be silica replaced foraminifera	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR54-13X	1. Rock Type: subvolcanic, diabase 2. Size: 19x11x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: doleritic 7. Matrix: medium grained Plg (~50%) + CPx (40-50%) + secondaries 8. Secondary Minerals: Chl ± Act 9. Encrustations: Fe-Mn crust ~2mm 10. Comment: Ar-Ar on Plg			1					
SO249-DR54-14X	1. Rock Type: subvolcanic, diabase, low degree of alteration 2. Size: 22x12x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained Plg (~50%) + CPx (40-50%) 8. Secondary Minerals: Chl ±Cc ±Act 9. Encrustations: Fe-Mn crust								no picture
SO249-DR54-15X	1. Rock Type: subvolcanic, diabase, low degree of alteration 2. Size: 16x4x9 cm from boulder S 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained Plg (~50%) + CPx (40) + secondary 8. Secondary Minerals: Chl ±Act 9. Encrustations: Fe-Mn crust ~1.5mm								no picture
SO249-DR54-16X	1. Rock Type: volcanic, Plg phyric andesitic basalt or dacite, very fresh 2. Size: 9x7x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey / white 5. Texture / Vesicularity: porphyritic 7. Matrix: fine grained, Plg + Px + Qtz 8. Secondary Minerals: very fresh 9. Encrustations: no crust								
SO249-DR54-17X	1. Rock Type: sedimentary, contact between ploymict sandstone and argillite 2. Size: 9x5x3 cm 3. Shape / Angularity: agular 4. Color of cut surface: yellow-grey 5. Texture / Vesicularity: sandstone-argillite 7. Matrix: variable 8. Secondary Minerals: clay minerals + all minerals characteristic of sandstone 9. Encrustations: Fe-Mn crust ~1-2mm								
SO249-DR54-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR55

Stalemate Fracture Zone; northern flank from base to near ridge crest

Dredge on bottom UTC 26/06/16 15:52hrs, lat 50°28.16'N, long 173°02.02'E, depth 4166 m

Dredge off bottom UTC 26/06/16 17:03hrs, lat 50°27.77'N, long 173°01.86'E, depth 3744 m

total volume: 1/6 full

Comments: Relatively fresh Plg phyric lava fragments which maybe ok for dating (-1 to -6). Sample -7 and -8 are Fsp - Amph phyric lava that most likely are ice rafted material from the Aleutians. Summary: Few insitu Plg phyric lavas are good for geochemistry and possible Ar-Ar dating

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR55-1	1. Rock Type: volcanic, relatively fresh 2. Size: 21x21x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, slight brownish alteration next to cracks 5. Texture / Vesicularity: porphyric, dense (no vesicles or vesicles filled by secondary minerals) 6. Phenocrysts: Fsp (1-4mm, 10%, relatively fresh) 7. Matrix: fine grained matrix 8. Secondary Minerals: pyrite? filling of vesicles? 3-5% up to 2mm large 9. Encrustations: thin Mn coating, on one sideof the rock 1cm thick crust made of Qtz 10. Comment: largest sample of a group of similar rocks	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR55-2	1. Rock Type: volcanic, moderately fresh 2. Size: 25x10x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to light grey, brownish alteration next to cracks 5. Texture / Vesicularity: aphyric, dense 6. Phenocrysts: Fsp sub-mm needles, 1-2% 7. Matrix: fine grained matrix 8. Secondary Minerals: white filling of cracks 9. Encrustations: thin Mn coating 10. Comment: sample ist similar to -1 but has fewer and smaller Fsp needles	x							
SO249-DR55-3	1. Rock Type: volcanic, moderately fresh 2. Size: 16x11x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, brownish alteration next to cracks 5. Texture / Vesicularity: porphyric, dense, few vesicles (2%), all filled with brown material 6. Phenocrysts: Fsp, sub-mm to 2mm, 5-7% 7. Matrix: fine grained matrix 8. Secondary Minerals: white filling of cracks, brown material in vesicles 9. Encrustations: thin Mn coating 10. Comment: sample is similar to -1	x	x						
SO249-DR55-4	1. Rock Type: volcanic, moderately altered 2. Size: 15x15x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, some parts are brownish or whitish, often along cracks 5. Texture / Vesicularity: porphyric dense 6. Phenocrysts: Fsp, sub-mm to 3mm, 10-15% 7. Matrix: fine grained matrix 8. Secondary Minerals: white matrial in cracks 9. Encrustations: thin Mn coating 10. Comment: sample is similar to -1	x	x						

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SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR55-5	1. Rock Type: volcanic, moderately fresh 2. Size: 12x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, sometimes white brown 5. Texture / Vesicularity: porphyritic, dense 6. Phenocrysts: Fsp, sub-mm, sometimes 1-2mm, 10-15% 7. Matrix: fine grained 8. Secondary Minerals: white filling in cracks 9. Encrustations: thin Mn coating 10. Comment: sample belongs to a second group that looks different from -1 to -4	x	x						
SO249-DR55-6	1. Rock Type: volcanic, moderately fresh 2. Size: 8x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, small brownish parts 5. Texture / Vesicularity: pophyric, dense 6. Phenocrysts: Fsp, sub-mm, 10% 7. Matrix: fine grained 8. Secondary Minerals: white filling in cracks 9. Encrustations: thin Mn coating 10. Comment: similar to -5	x							
SO249-DR55-7	1. Rock Type: volcanic, relatively fresh 2. Size: 12x7x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey with large black and white phenocrysts 5. Texture / Vesicularity: porphyric, 5% vesicles, unfilled 6. Phenocrysts: Fsp, 2-7mm, 20-25%; Amph, partly hypidiomorphic, 1-4mm, 10% 7. Matrix: fine grained 9. Encrustations: thin Mn coating 10. Comment: sample is unique in this dredge due to large phenecrysts. Could be ice-rafted material	x	x						
SO249-DR55-8	1. Rock Type: volcanic, fresh 2. Size: 10x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark to medium grey 5. Texture / Vesicularity: porphyric, 10-15% vesicles, open 6. Phenocrysts: Fsp, 1-2mm, 7-10%, black minerals Amph?, 2-4mm (one is 1cm) , 5-7%, 7. Matrix: fine grained matrix 9. Encrustations: very thin Mn crust 10. Comment: uniqe sample, differs from all other samples and could be a ice rafted material	x	x						
SO249-DR55-9	1. Rock Type: sediment 2. Size: 17x9x6 cm 3. Shape / Angularity: aub-angular 4. Color of cut surface: dark and medium grey + white 5. Texture / Vesicularity: dark grey and white grains in a fine graiend matrix; well sorted 7. Matrix: fine grained 9. Encrustations: thin Mn-coating								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR55-10	1. Rock Type: volcanic, altered 2. Size: 10x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, phenocrysts are white, large parts are brownish due to alteration 5. Texture / Vesicularity: porphyric, large vesicles 6. Phenocrysts: Fsp, sub-mm to 1mm, 15% 7. Matrix: fine grained 8. Secondary Minerals: brown vesicle filling								
SO249-DR55-11X	1. Rock Type: three pieces similar to sample -5 & -6 2. Size: (12x7x6 cm, 12x6x5 cm, 7x7x6 cm)								
SO249-DR55-12X	1. Rock Type: one piece similar to -1 to -4 2. Size: 10x8x6 cm								
SO249-DR55-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR56

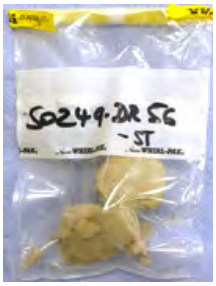
Stalemate Fracture Zone; northern flank, 9nm from DR55

Dredge on bottom UTC 26/06/16 21:47hrs, lat 50°34.45'N, long 173°53.62'E, depth 4147 m
Dredge off bottom UTC 26/06/16 23:12hrs, lat 50°34.03'N, long 172°53.41'E, depth 3656 m

total volume: few rocks

Comments: safety cable wrapped around chain bag so that no rock could get into it any longer. Two igneous rocks subangular to rounded. Rest are grey sediments. Sample -3 to tested TS if truely sediment. Overall station is of limited use

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR56-1	1. Rock Type: volcanic 2. Size: 12x9x5 cm 3. Shape / Angularity: sub-angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2%, 2mm) 7. Matrix: fine grained, Plg + black mineral Cpx? in groundmass 8. Secondary Minerals: alteration halo (~3mm)	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR56-2	1. Rock Type: volcanic 2. Size: 9x5x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (5%, 2mm), Amph (2%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: alteration halo (~3mm) and orange-yellow discoloration of some Plg	x							
SO249-DR56-3	1. Rock Type: sedimentary, sandstone 2. Size: 27x23x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted, medium grained sand 8. Secondary Minerals: alteration along fractures 9. Encrustations: Mn crust ≤ 1cm	x							
SO249-DR56-4	1. Rock Type: sedimentary 2. Size: 21x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grained 5. Texture / Vesicularity: sorted fine to medium grained sand 8. Secondary Minerals: white veins								
SO249-DR56-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR57

Stalemate Fracture Zone; northern flank, 8nm from DR56

Dredge on bottom UTC 27/06/16 03:21hrs, lat 50°39.4'N, long 172°44.62'E, depth 4054 m

Dredge off bottom UTC 27/06/16 05:21hrs, lat 50°38.94'N, long 172°44.41'E, depth 3657 m

total volume: 1/3 full

Comments: two very large fragments of Mn crust. Numerous small rocks, predominantly solidified sediments, some igneous, small pebbles. Priority: -1 to -4 relatively fresh aphyric and Plg phyric basalts. Good for geochemistry and possibly Ar-Ar. -5 gabbro norite -altered- but may contain zircon

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR57-1	1. Rock Type: volcanic, basalt 2. Size: 14x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7-10%, 0.5-1mm) 7. Matrix: very fine grained 8. Secondary Minerals: numerous fine veins filled with Qtz 9. Encrustations: thin Fe-Mn crust 10. Comment: Plg may be good for Ar-Ar, requires carelful preparation due to veining	x	x	2			MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR57-2	1. Rock Type: volcanic, basalt 2. Size: 18x15x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light to dark grey 5. Texture / Vesicularity: thick brownish alteration 7. Matrix: very fine, dark grey 8. Secondary Minerals: thick brownish alteration rind 9. Encrustations: thin Fe-Mn coanting 10. Comment: fresh Plg; good for Ar-Ar	x	x	1					
SO249-DR57-3	1. Rock Type: volcanic, basalt 2. Size: 12x5x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey to tan-grey 5. Texture / Vesicularity: massive, aphyric 7. Matrix: fine, diabasic, some slightly larger mafic minrals (Px?) 9. Encrustations: thin Fe-Mn coating 10. Comment: No veining, but may be partially, altered (tannish areas?)	x	x	2-3					
SO249-DR57-4	1. Rock Type: volcanic, basalt 2. Size: 10x9x4 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: dark grey, dark reddish 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Plg (15-20%, 0.5-1mm); Px (~15%, 0.5mm) 7. Matrix: very fine, dark grey 8. Secondary Minerals: Fe-oxides 9. Encrustations: thin Fe-Mn coating 10. Comment: Plg appears fresh, good for Ar-Ar	x	x	2					
SO249-DR57-5	1. Rock Type: plutonic, partially altered orthopyroxenite, gabbro norite 2. Size: 14x10x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light medium to dark grey 5. Texture / Vesicularity: coarse grained massive 6. Phenocrysts: 7. Matrix: coarse (~4-7mm) Bastite (altered OPx) 8. Secondary Minerals: whitish alteration veins, some altered Ol?, Actinolite / Chl?, possible Chrysotil 9. Encrustations: thin Fe-Mn coating 10. Comment: May contain zircon for U-Pb dating								
SO249-DR57-6	1. Rock Type: metamorphic 2. Size: 14x10x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to light grey 5. Texture / Vesicularity: fine grained, brecciated, veined 6. Phenocrysts: 7. Matrix: angular fragments of diabase (3-40mm) with lighter grey / tannish filled veins 9. Encrustations: thin Fe-Mn coating								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR57-7	1. Rock Type: sedimentary, jasper 2. Size: 10x8x6 3. Shape / Angularity: subangular 4. Color of cut surface: dark to light grey, tan 5. Texture / Vesicularity: massive, very fine grained 7. Matrix: Qtz 9. Encrustations: thin Fe-Mn coating								
SO249-DR57-8	1. Rock Type: sedimentary, chert 2. Size: 11x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: black 5. Texture / Vesicularity: massive, very fine grained 7. Matrix: Qtz 9. Encrustations: thin Fe-Mn coating 10. Comment: very fine veins / fractures partially filled with white Qtz. Maybe good for radiolarian research?								
SO249-DR57-9-Mn	1. Rock Type: large Mn nodule, part of bloc R 2. Size: 65x37x24 cm								no picture taken
SO249-DR57-10X-A	1. Rock Type: similar to -5 2. Size: 7x4x3 cm								
SO249-DR57-10X-B	1. Rock Type: similar to -5 2. Size: 6x3x4 cm								
SO249-DR57-10X-C	1. Rock Type: similar to -1 2. Size: 9x4x3 cm								
SO249-DR57-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR58

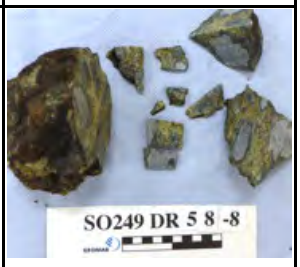
Stalemate Fracture Zone; northern flank, middle part along NE facing slope

Dredge on bottom UTC 27/06/16 10:55hrs, lat 50°53.23'N, long 172°15.89'E, depth 4453 m
Dredge off bottom UTC 27/06/16 12:24hrs, lat 50°52.70'N, long 172°15.97'E, depth 3930 m
total volume: 1/2 full
Comments:
mostly igneous rocks; dolerites / diabases and gabbro. Gabbro fragments from breccia. Some Mn crusts (~5cm thick). Diabases -1 to -4, gabbro -5 & -6

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR58-1	1. Rock Type: subvolcanic diabase, low degree of alteration 2. Size: 15x11x5 cm from big boulder F 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: doleritic 7. Matrix: Medium grained Px ≥50%, Plg 30%, fine, others = secondary 8. Secondary Minerals: Actinolite, Chl 9. Encrustations: Fe-Mn crust, 2 mm	x x(SAS)	x	1-2					
SO249-DR58-2	1. Rock Type: Subvolcanic diabase, low alteration degree, from big boulder S 2. Size: 15x12x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: doleritic 6. Phenocrysts: Px 50%, Plg 30-40% 7. Matrix: fine grained 8. Secondary Minerals: Actinolite, Chl, Qtz-veins 9. Encrustations: Mn-crust up to 2mm	x	x	1-2			MSC_SK	TS+GC by Airfreight	
SO249-DR58-3	1. Rock Type: subvolcanic, diabase from boulder R, low degree of alteration 2. Size: 27x13x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained, Px 40%, Plg 40%, Ol (altered) 5-10%; others secondary 8. Secondary Minerals: Chl, Actinolite 9. Encrustations: Fe-Mn crust ~2mm	x (x SAS)	x	1-2					
SO249-DR58-4	1. Rock Type: subvolcanic, low degree of alteration 2. Size: 12x9x7 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained, Px 40%, Plg 30%, others secondary 8. Secondary Minerals: Chl, ±Actinolite 9. Encrustations: Fe-Mn crust ~2mm	x	x	1-2					
SO249-DR58-5A	1. Rock Type: intrusive, microgabbro, from very big boulder M 2. Size: 15x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: medium grained, Px (20%), Plg (30%); others may be secondary 8. Secondary Minerals: Actinolite + Chl + Albite? 9. Encrustations: Fe-Mn crust 4mm	x (x SAS)	x	1-2					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR58-5B	1. Rock Type: intrusive, gabbro, from very big boulder M 2. Size: 18x15x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: coarse grained, Px (≥50-60%), Plg (30-40%); others secondary 8. Secondary Minerals: Chl + Actinolite 9. Encrustations: Fe-Mn crust 5mm 10. Comments: Plg good for Ar-Ar	x (x SAS)	x	1					
SO249-DR58-5C	1. Rock Type: intrusive, gabbro, from very big boulder M, low degree of alteration 2. Size: 12x10x5 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: coarse grained, Px (≥50%), Plg (40%); others secondary 8. Secondary Minerals: Actinolite + Chl + Albite? 9. Encrustations: Fe-Mn crust 5mm 10. Comments: Plg good for Ar-Ar	x (x SAS)	x	1					
SO249-DR58-6	1. Rock Type: intrusive, gabbro (gabbro-norite?), medium alteration 2. Size: 11x12x5 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: blueish grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: coarse grained, CPx (40%), Plg (~30%), OPx (≥10%); others secondary 8. Secondary Minerals: Actinolite + Chl + Albite? 9. Encrustations: Fe-Mn crust ~2mm 10. Comments: Plg good for Ar-Ar	x (x SAS)	x	1					
SO249-DR58-7	1. Rock Type: intrusive, gabbro, medium degree of alteration 2. Size: 10x6x4 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: coarse grained, Px (40%), Plg (~50%), Ol (5-10%); others secondary 8. Secondary Minerals: Actinolite + Chl + Albite? 9. Encrustations: none 10. Comments: Plg good for Ar-Ar	x (x SAS)							
SO249-DR58-8	1. Rock Type: sedimentary, breccia composed of gabbroic lithoclasts. Matrix clay minerals 2. Size: 19x12x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: yellow greenish grey 5. Texture / Vesicularity: brecciated 7. Matrix: gabbro as above, matrix fine grained 8. Secondary Minerals: Chl, clay minerals 9. Encrustations: Fe-Mn crust, 2mm	x (x SAS)							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR58-9	1. Rock Type: intrusive, microgabbro, low degree of alteration 2. Size: 17x12x8 cm 3. Shape / Angularity: slightly altered 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: gabbro, ophytic 7. Matrix: medium grained, Px ~50%, Plg ~40%, others secondary 8. Secondary Minerals: Chl + Actinolite 9. Encrustations: Fe-Mn crust, ~2mm	x	x						
SO249-DR58-10	1. Rock Type: intrusive, diabasic rock, high degree of alteration 2. Size: 16x10x6 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained, Px ~40-50%, Plg ~30-40%, others secondary 8. Secondary Minerals: Chl, Qtz (in veins), Actinolite 9. Encrustations: Fe-Mn crust, 2mm	x (x SAS)							
SO249-DR58-11	1. Rock Type: intrusive diabase 2. Size: medium degree of alteration 3. Shape / Angularity: 11x6x4 cm 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic (microintersertal) 7. Matrix: very fine grained, Px ~40-50%, Plg 20-30%, others secondary 8. Secondary Minerals: Chl, Actinolite 9. Encrustations: Fe-Mn crust, 2mm	x	x						
SO249-DR58-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR59

Stalemate Fracture Zone; middle part, along NE facing slope

Dredge on bottom UTC 27/06/16 17:37hrs, lat 51°01.44'N, long 172°01.33'E, depth 4272 m

Dredge off bottom UTC 27/06/16 19:05hrs, lat 51°01.06'N, long 172°01.02'E, depth 3814 m

total volume: 1/3full

Comments: Three large blocs of Mn crust , two large igneous boulders that after closer inspection and sawing turned out to be ice rafted material. One boulder is a slightly Amph-Plg phyric lava and the other a highly porphyric Plg-Amph lava. Sample -2 to -4 are aphyric lava fragments and most likely insitu. -5 is another Plg-Amph phyric lava and thus a dropstone similar to -1 and -6. -8 is an unusually altered coarse grained rock. Summary: samples -2 to -4 are likely insitu, aphyric lava that may be useful for geochemistry

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR59-1	1. Rock Type: volcanic 2. Size: 55x31x24 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (<1%, 1mm), Amph (1%, 2mm) 7. Matrix: fine grained dense 8. Secondary Minerals: Plg partially altered; alteration halo (~0.5-1cm) 9. Encrustations: Mn crust (≤1cm) 10. Comment: this is a mildly altered Hornblende basalt. If Amph confirmed by TS then this rock represents ice rafted material	x	x						
SO249-DR59-2	1. Rock Type: volcanic 2. Size: 11x10x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 6. Phenocrysts: aphyric 7. Matrix: fine grained, dense 9. Encrustations: Mn crust (~1cm) 10. Comment: samples -2 to -4 are a group of aphyric volcanic rocks	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR59-3	1. Rock Type: volcanic 2. Size: 12x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense fine grained	x	x						
SO249-DR59-4	1. Rock Type: volcanic 2. Size: 12x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense & fine grained 8. Secondary Minerals: alteration halo (2mm -1cm) and alteration along fractures 9. Encrustations: pertially encrusted with Mn (~2mm)	x	x						
SO249-DR59-5	1. Rock Type: volcanic 2. Size: 29x28x22 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: the fresh core is medium grey and teh alteration halo greenish grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (15%, 2mm), Amph (10%, 2mm) 7. Matrix: dense fine grained 8. Secondary Minerals: alteration halo (5-10%) 10. Comment: most likely a dropstone	x							
SO249-DR59-6	1. Rock Type: volcanic, moderately altered 2. Size: 10x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (2%, 1mm) 6. Phenocrysts: Plg (7%, 3mm), Amph (5%, 2mm) 7. Matrix: fine grained 10. Comment: likely a dropstone	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR59-7	1. Rock Type: sedimentary 2. Size: 13x13x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: layered coarse grained sand	x							
SO249-DR59-8	1. Rock Type: intrusive(?), highly altered 2. Size: 14x14x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: ocker 5. Texture / Vesicularity: phaneritic + medium grained 9. Encrustations: partially encrusted with Mn	x							
SO249-DR59-9	1. Rock Type: sedimentary 2. Size: 11x8x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: well sorted fine grained sand 8. Secondary Minerals: alteration halo (3mm-1cm)	x							
SO249-DR59-10-Mn	1. Rock Type: layered Mn crust 2. Size: 39x29x7 cm								no pictures taken
SO249-DR59-11-Mn	1. Rock Type: layered Mn crust 2. Size: 39x29x7 cm								no pictures taken
SO249-DR59-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR60

Stalemate Fracture Zone; 2nd shallowest ridge of entire FZ. Steep N facing slope from base to mid section

Dredge on bottom UTC 28/06/16 02:57hrs, lat 51°27.76'N, long 171°13.24'W, depth 3836 m
Dredge off bottom UTC 28/06/16 05:05hrs, lat 51°27.34'N, long 171°12.99'W, depth 3230 m

total volume: few rocks

Comments: brecciated and hydrothermally altered diabases

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR60-1	1. Rock Type: subvolcanic, diabase, strongly altered 2. Size: 18x4x9 3. Shape / Angularity: slightly altered 4. Color of cut surface: green (with white Qtz veins) 5. Texture / Vesicularity: disintegrated dolerite 7. Matrix: fine grained Px (~40%), Plg (~30%) 8. Secondary Minerals: Chl + Qtz (vens) ± Hem 9. Encrustations: Fe-Mn crust up to 5mm	x (xSAS)	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR60-2	1. Rock Type: subvolcanic, diabase, strongly altered 2. Size: 11x9x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: green (+ white because of Qtz veins) 5. Texture / Vesicularity: disintegrated dolerite 7. Matrix: fine grained Px (20-30%), Plg (45%) ±Ol(?), others secondary 8. Secondary Minerals: Qtz + Chl + Epidote 9. Encrustations: Fe-Mn crust, ~2mm	x (xSAS)							
SO249-DR60-3	1. Rock Type: subvolcanic diabase 2. Size: 30x13x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: green 5. Texture / Vesicularity: cataclastic, brecciated 7. Matrix: fine grained, Px, Plg very altered 8. Secondary Minerals: Chl + Qtz (in veins) 9. Encrustations: Fe-Mn crust ~3mm	x (xSAS)							
SO249-DR60-4	1. Rock Type: subvolcanic, diabase (dolerite). Different than described above in color (lighter), strongly altered 2. Size: 29x28x10 cm from boulder S 3. Shape / Angularity: angular 4. Color of cut surface: pale greenish grey 5. Texture / Vesicularity: doleritic, aphyric 7. Matrix: fine grained; Px+Plg+Mt very small 8. Secondary Minerals: Chl + Qtz 9. Encrustations: Fe-Mn crust up to 2mm	x (xSAS)	x						
SO249-DR60-5	1. Rock Type: subvolcanic, dolerite simiar to -4 2. Size: 9x6x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained, Px, Plg ± Ol (oxidized) 8. Secondary Minerals: Chl, Qtz 9. Encrustations: no crust	x (xSAS)							
SO249-DR60-6	1. Rock Type: subvolcanic or volcanic. Tectonically disintegrated and hydrothermally strongly overprinted / metamorphosed 2. Size: 11x9x6 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: pale bluish green 5. Texture / Vesicularity: cataclastic massive 7. Matrix: medium grained, possible Px + Plg (very altered) 8. Secondary Minerals: blue colors from secondary minerals Qtz, Chl, Albite 9. Encrustations: Fe-Mn crust ~1.5mm	x (xSAS)							
SO249-DR60-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR61

Stalemate Fracture Zone; 2nd shallowest ridge of entire FZ. E of DR60 further upslope beneath ridge crest. Steep N facing slope from mid section to top

Dredge on bottom UTC 28/06/16 08:49hrs, lat 51°23.60'N, long 171°16.35'E, depth 3071 m

Dredge off bottom UTC 28/06/16 10:13hrs, lat 51°27.17'N, long 171°16.10'E, depth 2508 m

total volume: 1/2 full

Comments: Thick Mn crusts with fragments of Ol-Plg phyric basalts (pillow lava). One lava fragment has fresh glass. A large bloc of breccia with fragments of gabbro and possibly dolerites. Priority -1 to -5 pillow lava fragments, -2 fresh glass (!), -11 breccia with gabbro

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR61-1	1. Rock Type: volcanic, dolorite?, moderately altered pillow lava 2. Size: 14x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey to brownish 5. Texture / Vesicularity: subophytic 6. Phenocrysts: Plg, ~7%, up to 2mm, Px?, sub-mm 7. Matrix: fine grained 8. Secondary Minerals: altered Ol, possibly Fe-oxyhydroxides 9. Encrustations: Mn crust up to 0.5 cm 10. Comment: amount of Px is difficult to estimate	x (xSAS)	x	?					
SO249-DR61-2	1. Rock Type: volcanic, relatively fresh pillow lava with fresh glass (!) 2. Size: 8x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: greyish to light brown, outer part dark brown to black 5. Texture / Vesicularity: porphyric, <1% open vesicles 6. Phenocrysts: Plg (5%, up to 1mm), some crystals have needle shape, maybe Px 7. Matrix: fine grained 8. Secondary Minerals: reddish altered Ol up to 1mm 9. Encrustations: Mn crust up to 1mm 10. Comment: sample contains fresh glass, which is in a separat whirl pack along with the TS billets	x			x		MSC_SK	TS by Airfreight, GC taken out	
SO249-DR61-3	1. Rock Type: volcanic, moderately altered 2. Size: 14x10x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to reddish 5. Texture / Vesicularity: sub-porphyric 6. Phenocrysts: Plg, sub-mm to 1mm 7. Matrix: fine grained 8. Secondary Minerals: reddish altered Ol, up to 3mm, cracks filled (with sediment?) 9. Encrustations: thin Mn coating	x	x						
SO249-DR61-4	1. Rock Type: moderately altered pillow lava 2. Size: 9x9x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: reddish brown 5. Texture / Vesicularity: porphyric , 1% vesicles, filled with sediment 6. Phenocrysts: Plg, sub-mm up to 1mm, some are needle shaped, Px sub-mm, ~5% 7. Matrix: fine grained 8. Secondary Minerals: reddish altered Ol, up to 3mm, cracks filled with sediment, Fe-oxyhydroxides 9. Encrustations: thin Mn coating	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR61-5	1. Rock Type: volcanic, relativley fresh Ol basalt 2. Size: 8x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey to light brownish 5. Texture / Vesicularity: porphyric, 2-3% vesicles, mostly unfilled 6. Phenocrysts: maybe Plg, Px, oxidized up to 1-2mm, ~7-10%; small crystals in needle shape maybe previous glass 7. Matrix: fine grained 8. Secondary Minerals: reddish altered Ol & Px up to 2mm; several cracks some filled with sediment 10. Comment: relatively fresh compared to previous samples of DR61, but smaller	x	x						
SO249-DR61-6	1. Rock Type: volcanic, altered, Ol-basalt 2. Size: 47x42x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: orange-brown to reddish 5. Texture / Vesicularity: microcrystaline, 2% vesicles, mostly unfilled 6. Phenocrysts: Px, some oxidized, up to 1 mm, 5-7%; Ol altered 7. Matrix: fine grained 8. Secondary Minerals: reddish altered Ol and Px, up to 3 mm, several cracks filled with sediment and Mn 9. Encrustations: thin Mn coating 10. Comment: similar to sample 5, but slightly less crystallized and more altered; smaller part of bloc V	2x (1 SAS)	x						
SO249-DR61-7	1. Rock Type: volcanic, altered, Ol-basalt 2. Size: 32x20x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: red-brownish 5. Texture / Vesicularity: microgranitic, 2% vesicles, mostly unfilled 6. Phenocrysts: Px, up to 1 mm; Ol, up to 2 mm 7. Matrix: fine grained 8. Secondary Minerals: Reddish altered Ol and Px, up to 2 mm, several cracks filled with sediment and Mn 9. Encrustations: thin Mn coating 10. Comment: similar to samples 5 and 6, but more altered. Smaller part of block W	x	x						
SO249-DR61-8	1. Rock Type: volcanic, moderately altered, Ol-basalt 2. Size: 26x23x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: light to dark greyish 5. Texture / Vesicularity: microcrystalline 6. Phenocrysts: oxidized Px, up to 1 mm, 10% 7. Matrix: fine grained 8. Secondary Minerals: several cracks and veins with red fillings (poss. silica), some filled with Mn, reddish altered Px. 9. Encrustations: thin Mn coating 10. Comment: Possible for geochemistry but careful picking because of reddish cracks and fillings! Smaller part of bloc X.	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR61-9	1. Rock Type: Volcanic breccia within Mn crust, moerately altered, sveral basalt parts 2. Size: 18x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: microcrystalline 6. Phenocrysts: Px and Ol, similar to previous samples 7. Matrix: fine grained 8. Secondary Minerals: several cracks and veins, filled with Mn and red fillings (like -8) 9. Encrustations: Mn crust up to 3 cm 10. Comment: sample contains different big basalt fragments, TS from one of the fresher-looking basalt parts	x							
SO249-DR61-10	1. Rock Type: similar to sample 9 2. Size: 15x10x9	x							
SO249-DR61-11	1. Rock Type: gabbroic breccia 2. Size: 31x28x15 cm 7. Matrix: fine grained, slightly greenish matrix (chlorite? actinolite?) 9. Encrustations: Mn crust up to 5 mm 10. Comment: Smaller part of block O. Detailed description of one gabbroic part of the breccia: 1. Rock Type: intrusive, gabbro, moderately altered, in-situ breccia 2. Size: various sizes up to 3-4 cm, largest up to 7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to greenish 5. Texture / Vesicularity: coarse grained 6. Phenocrysts: Px and Plg 50:50 10. Comment: clasts are similar in various sizes, unsorted. Plg and Px are fresh in some clasts and Plg good for Ar-Ar. Geochemistry is also possible.	2x (1 SAS)		1-2					
SO249-DR61-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR62

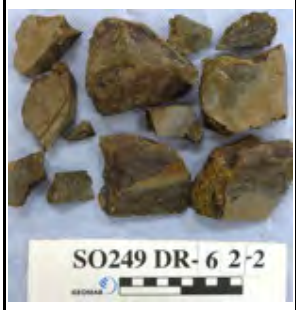
Emperor Seamount Province. Eastern slope of N-S striking ridge 20 nm south of Stalemate FZ

Dredge on bottom UTC 28/06/16 17:26hrs, lat 51°18.19'N, long 170°20.61'E, depth 4447 m

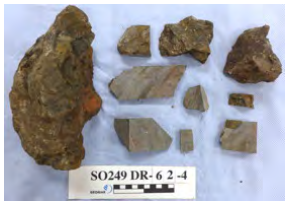
Dredge off bottom UTC 28/06/16 18:54hrs, lat 51°17.92'N, long 170°20.09'E, depth 3845

total volume: 1/5 full

Comments: Aphyric pillow, pillow fragments and Ol phyric lava fragments. -1 to -4 aphyric pillows and hyaloclastite attached with mostly altered glass but potential for spot analysis. Priority: -1 to -3 whole rock and glass; -5 lots of altered Ol (high MgO); -6 and -7 less Ol but fresher; -8, Plg phyric lava maybe okay for dating.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR62-1	1. Rock Type: volcanic rock, big pillow with glassy margin up to 3 mm, but mostly altered 2. Size: 40x30x25 cm 3. Shape / Angularity: rounded, pillow shape 4. Color of cut surface: dark grey with beige alteration 5. Texture / Vesicularity: aphyric with black minerals (CPx? microphenocrysts: 2%, >1 mm), outer layer altered orange 7. Matrix: fine grained 8. Secondary Minerals: a lot of fractures with mostly white filling 10. Comment: Thin glass margin, mostly altered but may contain fresh glass. Glass was separated from sample into a whirlpack and packed next to thin section billets. Biggest sample with potential glass. Sample -1 to -4 belong to a group aphyric pillow lavas	x	x		x		MSC_SK	TS by Airfreight, GC taken out	
SO249-DR62-2	1. Rock Type: brecciated volcanic rock, highly altered intra-pillow hyaloclastite with glass fragments in between two lava pieces 2. Size: 17x12x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brown and orange with a highly brecciated part with blak glass in between. Altered and brecciated parts are dark blueish grey 5. Texture / Vesicularity: porphyric part and brecciated part. A lot of fractures and very small transparent minerals in groundmass (Fsp? 3%, <1mm) 6. Phenocrysts: Fsp? microphenocrysts 7. Matrix: fine grained 8. Secondary Minerals: orange = altered Ol 10. Comment: hyaloclastite part with potential glass was separated	x			x				
SO249-DR62-3	1. Rock Type: highly altered volcanic rock with hyaloclastite attached similar to -2 2. Size: 15x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: orange altered matrix with dark grey minerals. Brecciated part: brown 'groundmass' with dark grey, slightly blue clasts (altered and subrounded) 5. Texture / Vesicularity: porphyric and breccia with lots of fractures 6. Phenocrysts: microphenocrysts in a matrix of aphyric part (1%, <<1 mm) 7. Matrix: fine grained 8. Secondary Minerals: orange altered glass? 10. Comment: see sample -2	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR62-4	1. Rock Type: volcanic, altered aphyric 2. Size: 27x21x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with blueish and reddish parts and mostly orange-filled fractures 5. Texture / Vesicularity: aphyric, lots of fractures, possibly brecciated 7. Matrix: fine grained	x	x						
SO249-DR62-5	1. Rock Type: volcanic; Ol basalt, picrite? 2. Size: 18x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: red-orange and grey 5. Texture / Vesicularity: porphyric, vesicular (1%, <1 mm), some vesicles are filled with dark grey material 6. Phenocrysts: altered Ol (40%, 1 mm) 7. Matrix: fine grained, black mineral (Fe-Ti oxides?) 8. Secondary Minerals: Iddingsite after Ol 10. Comment: Samples -5 to -7 are a group of Ol basalts with variable amounts of altered Ol	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR62-6	1. Rock Type: volcanic, Ol-Px basalt 2. Size: 17x16x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: red-orange and grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: altered Ol (10%, 1 mm); Px (5%, 2 mm) 7. Matrix: fine grained 8. Secondary Minerals: iddingsite after Ol	x	x				MSC_SK	TS by Airfr., GC taken out	
SO249-DR62-7	1. Rock Type: volcanic, Ol-Px basalt 2. Size: 10x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with some red-orange 5. Texture / Vesicularity: porphyritic, vesicular (<1%), some filled with black material; Mn? 6. Phenocrysts: altered Ol (5%, 1 mm); Px (1%, 2 mm) 7. Matrix: fine grained, altered Ol and Px? 8. Secondary Minerals: Iddingsite after Ol	x	x						
SO249-DR62-8	1. Rock Type: volcanic, Plg-basalt 2. Size: 13x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular (1%) 6. Phenocrysts: Plg (5%, 1 mm) 7. Matrix: fine grained 8. Secondary Minerals: some Plg is partially altered, but the rest is fresh. Red alteration halos along fractures. 10. Comment: some Plg glomerocrysts	x	x	x Plg?					
SO249-DR62-9	1. Rock Type: volcanic, aphyric lava 2. Size: 14x12x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 8. Secondary Minerals: alteration halo (1 cm), red minerals in alteration halo, alteration along fractures	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR62-10	1. Rock Type: volcanic, Px phyric lava 2. Size: 13x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Px (1%, 1 mm) 7. Matrix: fine grained, altered Ol 8. Secondary Minerals: Iddingsite in groundmass	x							
SO249-DR62-11	1. Rock Type: volcanic, Plg phyric lava 2. Size: 18x11x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, vesicular (1%), most vesicles filled with black material 6. Phenocrysts: Plg (2%, 2 mm) 7. Matrix: fine grained 8. Secondary Minerals: half of the sample is altered and half is fresh	x							
SO249-DR62-12	1. Rock Type: volcaniclastic 2. Size: 12x9x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey and black 5. Texture / Vesicularity: poorly sorted with angular clasts 10. Comment: may contain fresh glass	x							
SO249-DR62-13x	1. Rock Type: similar to -5 and -6 2. Size: 27x14x12 cm								
SO249-DR62-14x	1. Rock Type: similar to sample -4, aphyric group 2. Size: 11x11x7 cm								
SO249-DR62-15x	1. Rock Type: similar to sample -2 and -3, hyaloclastites 2. Size: 13x8x5 cm and 9x6x4 cm 10. Comment: may contain fresh glass								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR62-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR63

Emperor Seamount Province. Northeast slope of seamount located SW of DR62

Dredge on bottom UTC 29/06/16 00:53hrs, lat 51°09.45'N, long 169°51.44'E, depth 4441 m

Dredge off bottom UTC 29/06/16 02:35hrs, lat 51°09.01'N, long 169°51.09'E, depth 3946 m

total volume: 1/8 full

Comments: Thick Mn crusts, some rock cobbles, small pieces of igneous rocks with Mn crusts. Priority -1, -subaphyric Px basalt - most likely in situ rock.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR63-1	1. Rock Type: volcanic, Px-subporphyric basalt, medium degree of alteration 2. Size: 14x10x8 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Px: 1-3 mm, 5-10% 7. Matrix: Fine grained: Px (approx. 10%), Plg (approx. 50%) 8. Secondary Minerals: Act ± Chl 9. Encrustations: Fe-Mn crust approx. 2 mm	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR63-2	1. Rock Type: Volcanic: Ol basalt, medium degree of alteration 2. Size: 12x10x6 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: subporphyric 6. Phenocrysts: possible small Ol phenocrysts 1-2 mm, 5% 7. Matrix: fine graine.: Px + Plg in very fine grained matrix; ±Ol (5%) 8. Secondary Minerals: Chl, Fe-oxides 9. Encrustations: Mn crust: 3 mm	x	x				MSC_SK	TS+GC by Airfreight	
SO249-DR63-3	1. Rock Type: volcanic, aphyric basalt 2. Size: 8x6x6 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric 7. Matrix: Very fine grained. Px (40-50%), Plg (40-50%) 8. Secondary Minerals: Act & Chl 9. Encrustations: Fe-Mn crust up to 3 mm	x	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR63-4	1. Rock Type: volcanic, Ol-Plg phyric basalt, medium altered 2. Size: 8x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: subporphyric 6. Phenocrysts: Ol(?) 2% + Plg very small ≤3 mm, (3%) 7. Matrix: fine-grained groundmass; Plg (~40%), Px (~40%), Ol? (≤5%) 8. Secondary Minerals: Chl 9. Encrustations: Fe-Mn crust, 5 mm	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR63-5	1. Rock Type: volcanic, andesite, low degree of alteration, dropstone 2. Size: 10x7x4 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (4 mm, 10%), Px (~3 mm, 7%), Amph (2-3 mm, 7%) 7. Matrix: fine grained groundmass; Plg 30-40%, Px 20-30%, Hbl ~7%, others secondary 8. Secondary Minerals: Chl ±Act 9. Encrustations: Fe-Mn crust ≤2 mm 10. Comment: Plg + Amph good for Ar/Ar. Attention: very likely a dropstone!	x	x	Plg, Hbl					
SO249-DR63-6	1. Rock Type: sedimentary, volcaniclastic rock, strongly altered 2. Size: 15x13x10 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: brecciated with fragments of lithoclasts & crystalline clasts belonging to diabases and basalts 7. Matrix: fine to medium grained 8. Secondary Minerals: Chl + Act 9. Encrustations: Fe-Mn crust 5 mm	x	x						
SO249-DR63-7	1. Rock Type: subvolcanic, diabase 2. Size: from boulder U; 20x18x13 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine-medium grained, Cpx (50-60%), Plg (30-40%), olivine-secondary 8. Secondary Minerals: Act, Chl±Qtz 9. Encrustations: Fe-Mn crust ~1-2 mm	x x(SAS)	x						
SO249-DR63-8	1. Rock Type: Volcanic: Plg+Hbl andesite-basalt, very likely a dropstone 2. Size: 22x14x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: subporphyric 6. Phenocrysts: Plg (3 mm, 5-10%), Hbl (4 mm, 10%) 7. Matrix: fine grained, Plg (~30%), Hbl (10%), Px (~10-20%), others secondary 8. Secondary Minerals: Act ± Ab 9. Encrustations: Fe-Mn crust 2 mm 10. Comment: Ar/Ar: Plg, Hbl. Attention: Could be a dropstone!	x	x	Plg, Hbl					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR63-9	1. Rock Type: Sedimentary: arcosic sandstone 2. Size: 19x12x8 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: yellowish-brown 5. Texture / Vesicularity: sandstone 7. Matrix: fine-medium grained, Plg, Px, Amph, Qtz ±Kfs 9. Encrustations: Fe-Mn crust ~8 mm								
SO249-DR63-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR64

Emperor Seamount Province. Small cone on north facing slope of seamount E of Detroit

Dredge on bottom UTC 29/06/16 10:24hrs, lat 51°03.90'N, long 168°47.92'E, depth 2945 m

Dredge off bottom UTC 29/06/16 12:03hrs, lat 51°03.46'N, long 168°47.75'E, depth 2446 m

total volume: few rocks

Comments: Sample -1 to -5 are lava fragments with variable phenocryst content ranging from Ol-Px (-1) to Plg (-2 & -3) to Plg-Px (-5) phyric as well as aphyric varieties (-4). Such a variation is somewhat unexpected for a small (post erosional?) cone on the flanks of a guyot. Either the cone is a tectonic feature (collecting debris) or an ice rafted origin of some samples must be considered. Thus geochemistry must be carefully evaluated.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR64-1	1. Rock Type: volcanic or subvolcanic, fresh 2. Size: 23x19x8cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Ol (2%, 1mm) altered, Px (<1%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: thin veins filled with Fe-Mn oxides, some have a light colored mineral (Actinolite or Chl) 9. Encrustations: thin Fe-Mn coating 10. Comment: must be prepared carefully for geochemistry due to veining	x	x				MSC_SK	TS+GC by Airfreight	
SO249-DR64-2	1. Rock Type: volcanic, fresh 2. Size: 10x9x6 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: medium dark grey 5. Texture / Vesicularity: porphyric, vesicular (~1mm, 20%) 6. Phenocrysts: Plg (0.5-2mm, 20%) fresh 7. Matrix: aphanytic 8. Secondary Minerals: some vesicles filled with greenish brown material, may be mud 9. Encrustations: thin Fe-Mn coating 10. Comment: fresh Plg good for Ar-Ar	x	x	1-2			MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR64-3	1. Rock Type: volcanic, somewhat fresh 2. Size: 13x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium drak grey 5. Texture / Vesicularity: porphyric, vesicular (2-7mm, 2%) 6. Phenocrysts: Plg (~1mm, 5%) 7. Matrix: fine grained; Plg, OPx?, Amph? 8. Secondary Minerals: some vesicles completely filled wih light greenish minerals. Some vesicles have reddish Fe-oxide linings. Also some fine veining with Fe-Mn oxides 9. Encrustations: very thin Fe-Mn coating 10. Comment: Plg may be fresh, difficult to tell	x	x	2?					
SO249-DR64-4	1. Rock Type: volcanic, fresh 2. Size: 9x7x4 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: red-dark grey 5. Texture / Vesicularity: fine grained massive, <1% vesicles (~0.5mm) 7. Matrix: fine 8. Secondary Minerals: possibly some minor sulfides. few cracks with Fe-Mn oxides 9. Encrustations: thin Fe-Mn coanting								
SO249-DR64-5	1. Rock Type: volcanic, somewhat fresh 2. Size: 9x6x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey to medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (35%, ~1mm) some fresh, some altered; Px (3%, 1-4mm) 7. Matrix: fine grained, aphyric 8. Secondary Minerals: numerous veins with red (Fe-oxide) or whitish (Chl / Actinolite?) fillings. Some Plg altered to Chl 9. Encrustations: thon Fe-Mn coating 10. Comment: Mut be prepared carefully for geochemistry due to veining. Some Plg may be fresh enough for Ar-Ar.	x	x	2-3					
SO249-DR64-6	1. Rock Type: volcanic breccia, partially altered 2. Size: 20x18x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey / back dark reddish 5. Texture / Vesicularity: Mostly fine to very fine marix containing subrounded to angular clasts of altered volcanic (?) material. Clasts are 1-7cm, greenish grey to pale greenish, possibly with filled vesicles 7. Matrix: fine grained, appears basaltic with ~7% slightly larger Plg (0.5mm) 8. Secondary Minerals: alteration of clasts, Plg appears partially altered 9. Encrustations: Mn crust up to 1cm 10. Comment: possibly welded tuff?	x							

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR64-7	1. Rock Type: volcaniclastic, altered 2. Size: 12x10x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brownish, grey, greenish 5. Texture / Vesicularity: porphyritic, <1% vesicles (0.5-1mm) 6. Phenocrysts: altered Px+Plg?, 20-80%, 1-5mm 7. Matrix: fine grained 8. Secondary Minerals: greenish-yellowish alteration minerals, Glaucophane, Chl, Actinolite. May contain pieces of altered glass 9. Encrustations: thin Fe-Mn crust 10. Comment: may be altered volcanic breccia	x							
SO249-DR64-8	1. Rock Type: volcanic, altered 2. Size: 13x12x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: fine grained 7. Matrix: fine 8. Secondary Minerals: greenish material (Chl/Actinolite?). Also brownish alteration halos ~0.5.1cm around fractures 9. Encrustations: thin Fe-Mn crust	x							
SO249-DR64-9	1. Rock Type: sedimentary 2. Size: 10x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-yellowish brown 5. Texture / Vesicularity: very fine sand to mud, irregular laminated veins ~1-2mm 9. Encrustations: thin Fe-Mn coating	x							
SO249-DR64-10	1. Rock Type: sedimentary 2. Size: 10x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: medium grained massive sandstone. Grains appear to be mostly intermediare to mafic volcanic material. Has a few fine fractures. Volcanic material appears mostly fresh but has some partially altered fragments (Plg --> Chl?)	x							
SO249-DR64-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR65

Emperor Seamounts. "Late stage" seamount at the SW margin of Detroit Tablemount. Seamount formed after Detroit guyot submerged. Appears to have formed entirely submarine as no plateau exists in the top region. Dredge track located in the SE of corner at the base of the seamount along a SSE facing slope.

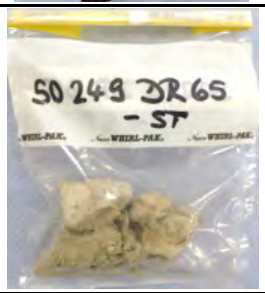
Dredge on bottom UTC 29/06/16 22:54hrs, lat 50°31.96'N, long 167°28.97'E, depth 3313 m

Dredge off bottom UTC 30/06/16 00:25hrs, lat 50°32.39'N, long 167°28.51'E, depth 2897 m

total volume: 1/8 full

Comments: Platy Mn crusts, freshly broken (-6). Very few hard rocks; heterolithological, many rounded. Only -1 is an angular Plg-Px phyric lava fragment that might be insitu. However, as the slope is obviously covered with Mn crust it is doubtful that the rock debris originates from the seamount and that rather all of them represent dropstones.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR65-1	1. Rock Type: volcanic 2. Size: 11x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (10%, 2mm), Px (5%, 2mm) 7. Matrix: dense, fine grained 8. Secondary Minerals: few altered Plg near outside of rock 9. Encrustations: Mn patches 10. Comment: though angular it is likely a dropstone based on consideration in "comments". To small to make GC slab.	x					MSC_SK	TS+GC by Airfreight	
SO249-DR65-2	1. Rock Type: volcanic 2. Size: 11x8x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, <1% vesicles 6. Phenocrysts: Px (3%, 2mm) 7. Matrix: fine grained, groundmass Plg 8. Secondary Minerals: alteration along fractures and alteration halo (5mm) 10. Comment: most likely a dropstone	x	x						
SO249-DR65-3	1. Rock Type: intrusive, diorite 2. Size: 7x6x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: holocrystalline 6. Phenocrysts: Amph (10%, 1mm), Fsp (30%, 2mm), Qtz (60%, 1mm) 8. Secondary Minerals: alteration halo (~5mm) 10. Comment: dropstone based on roundness and mineralogy	x							
SO249-DR65-4	1. Rock Type: volcaniclastic 2. Size: 7x6x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: poorly sorted, fine to coarse grained 6. Phenocrysts: Qtz, Fsp + Px 7. Matrix: fine grained, green 8. Secondary Minerals: green matrix could be altered glass 10. Comment: may be insitu if indeed volcaniclastic. To be confirmed by TS	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR65-5	1. Rock Type: sedimentary 2. Size: 14x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: sorted, fine grained, angular to subrounded sand 6. Phenocrysts: 7. Matrix: 8. Secondary Minerals: alteration halo (~5mm) and alteration along fractures. 10. Comment: sedimentary origin to be confirmed by TS								
SO249-DR65-6	1. Rock Type: layerd Mn crust 2. Size: 15x15x15 cm 3. Shape / Angularity: platy								
SO249-DR65-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR66

Emperor Seamounts. Top region of "Late stage" seamount at the SW margin of Detroit Tablemount. Cone like structure at the NW end of ridge crest. NE facing slope towards top of the cone

Dredge on bottom UTC 30/06/16 04:17hrs, lat 50°39.09'N, long 167°21.98'E, depth 2252 m

Dredge off bottom UTC 30/06/16 05:46hrs, lat 50°38.59'N, long 167°21.64'E, depth 1917 m

total volume: 1/2 full

Comments: Extremely heterolithological dredge with abundant rounded rocks. Such a variety is unexpected for a late stage cone in absence of moprphological indicators for subaerial exposure (beach pebbles). Therefore the vast majority of rocks represents ice rafted material that accumulated along the slopes where currents around the top inhibit significant sedimentation. Alternatively it may simply reflect a "recent" drop. Sample -1 and -2 are somewhat similar Ol-basalt that could be insitu based on mineralogy. Sample -3 and -4 are Ol-Px and Px pyric lava respectively. All of them must be treated with extrem caution and if ever analyzed require whole rock chemistry and age dating. Londsdale et al. 1993 (JGR Vol.98; pp 4081-4098) describe insitu volcaniclastic rocks from the southern flank of the cone.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR66-1	1. Rock Type: volcanic, Ol phyric basalt, ~fresh, very likely a dropstone 2. Size: 17x14x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, slightly vesicular 6. Phenocrysts: Ol, <5%, ≤0.5mm 7. Matrix: massive, doleritic, fine grained 8. Secondary Minerals: oxides after Ol, some Mn in vesicles, also light colored fillings in vesicles 9. Encrustations: very thin Mn crust (<1mm) 10. Comment: slightly altered (~nearly fresh) Ol basalt that is good for GC and Ar-Ar. Based on mineralogy it could represent insitu rock but a dropstone origin is more likely.	x	x	1-2 grondmass?			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR66-2	1. Rock Type: volcanic, rare ol phyric basalt 2. Size: 14x11x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: probably Ol, replaced with dark brownish grey secondary stuff, <5%, ≤1mm 7. Matrix: massive, doleritic, fine grained 8. Secondary Minerals: serpentinite after Ol (?), some Chl 9. Encrustations: thin Mn crust on outer surface 10. Comment: slightly altered Ol basalt. Matrix fresh. Good for geochemistry and Ar/Ar. The sample is petrographycally similar to -1 but a dropstone origin is very likely.	x	x	1-2 grondmass?					
SO249-DR66-3	1. Rock Type: volcanic, Ol-Px-Plg basalt, moderately altered 2. Size: 16x10x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, slightly vesicular (some contraction (?) voids and fractures 6. Phenocrysts: Ol ≤10%, ≤1mm; CPx ≤5%, ≤2mm; Plg ≤10%, <1mm 7. Matrix: microlithic, fine grained 8. Secondary Minerals: serpentinite after Ol, Chl in matrix 9. Encrustations: thin Mn crust, ≤2mm 10. Comment: very likely insitu rock. Good for geochemistry and Ar-Ar	x	x	1-2 Plg					
SO249-DR66-4	1. Rock Type: volcanic, Px phyric lava 2. Size: 31x24x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium dark grey, greenish grey 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Px (≤1mm, 30%) most are microphenocrysts 7. Matrix: aphyric, greenish grey material 8. Secondary Minerals: Qtz veins (0.5-5mm. Px appears altered in cracks 9. Encrustations: Fe-Mn coating, mostly thin but patches of crust up to 1mm thick 10. Comment: GC requires careful preparation due to veining but unveined areas appear fresh. Part of bloc L	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR66-5X	1. Rock Type: volcanic, basaltic tuff or fine grained basalt 2. Size: 14x11x9 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey slightly greenish 5. Texture / Vesicularity: massive, contains xenolith 6. Phenocrysts: unclear (Px?, Plg?) 7. Matrix: fine grained, massive 8. Secondary Minerals: Chl, pervasive alteration 9. Encrustations: thin Mn film on surface 10. Comment: Altered, not suitable for GC. The sample was taken because of xenolith which maybe mantle xenolith or strongly, hydrothermally reworked volcanic rock	x							
SO249-DR66-6X	1. Rock Type: volcanic (?), altered / partially altered 2. Size: 20x11x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, bluish grey 5. Texture / Vesicularity: porphyritic, massive no vesicles 6. Phenocrysts: Amph? (1-10mm, 7%), cloudy bluish green grains (1-3mm, 50%), altered Plg? (1-3mm, 7%) 7. Matrix: fine grained grey material 8. Secondary Minerals: thin veins with pale yellowish filling 9. Encrustations: patchy Fe-Mn crusts coating up to 1mm								
SO249-DR66-7X	1. Rock Type: volcanic 2. Size: 14x10x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium light grey, tan-grey 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Plg (1mm, 35%), Px (1-2mm, 25%), altered Ol (?) 7. Matrix: fine grained 8. Secondary Minerals: few very thin fractures with Fe-oxide fillings. Plg appears partially altered (zeolite / Chl) 9. Encrustations: Fe-Mn coating up to 0.5mm								
SO249-DR66-8X	1. Rock Type: volcanic, altered (Px-phyric basalt or basaltic andesite) 2. Size: 18x11x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greyish green blue 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: Px (1-4mm, 35%), fresh to partially altered 7. Matrix: fine grained, green-blue material 8. Secondary Minerals: brownish green mineral replacing Px. Also olive-green alteration rim mm-cm around margin of rock 9. Encrustations: Fe-Mn rind, 1-3mm thick								
SO249-DR66-9X	1. Rock Type: sedimentary or metasedimentary 2. Size: 20x13x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey black 5. Texture / Vesicularity: laminated (~3-4mm), very fine grained 7. Matrix: mud 8. Secondary Minerals: some white material bwtween laminations 9. Encrustations: thin Fe-Mn coating								

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR66-10X	1. Rock Type: sedimentary, sandstone -arkose 2. Size: 24x18x14 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: massive, medium sand 7. Matrix: grains consist of Qtz, Fsp, Phlogopite, minor mafic grains 8. Secondary Minerals: Fe-Mn coating up to 1mm 10. Comment: part of bloc Z; dropstone								
SO249-DR66-11X	1. Rock Type: intrusive, granite 2. Size: 10x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light to grey, black 5. Texture / Vesicularity: massive, coarse grained (1-3mm) 6. Phenocrysts: Qtz (70%), Bt (20-25%), Fsp (5-10%) 9. Encrustations: thin Fe-Mn coating 10. Comment: dropstone								
SO249-DR66-12X	1. Rock Type: sediment, brecciated chert 2. Size: 11x9x6 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark to red grey, some red brown 5. Texture / Vesicularity: very fine grained; angular fragments of chert (1-50mm) cemented together with lighter grey silica. A few veins filled with pale yellowish material, also some red-brown (Fe-oxide) fillings 9. Encrustations: Fe-Mn crust up to 8mm 10. Comment: dropstone								
SO249-DR66-13X	1. Rock Type: metamorphic, amphibolite 2. Size: 11x10x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey to black, minor white spots 5. Texture / Vesicularity: fine grained 7. Matrix: Amph 60%, 40% Qtz 9. Encrustations: thin Fe-Mn coating 10. Comment: dropstone								
SO249-DR66-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR67

Emperor Seamounts at Detroit Seamount. Western edge of the plateau, 2nd step below the plateau edge

Dredge on bottom UTC 30/06/16 11:46hrs, lat 50°33.86'N, long 167°04.34'E, depth 4308 m
Dredge off bottom UTC 30/06/16 12:59hrs, lat 50°34.10'N, long 167°04.98'E, depth 3876 m
total volume: few rocks
Comments: insitu sediment (-2) along with green shist facies amphibolite dropstone (-1)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR67-1	1. Rock Type: metamorphic, green shist facies amphibolite 2. Size: 7x6x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey black 5. Texture / Vesicularity: foliated, very fine banded 7. Matrix: very fine grained Amph, Cc, Qtz 8. Secondary Minerals: all phases are metamorphic 9. Encrustations: Fe-oxide crust, ~1-2mm 10. Comment: dropstone	x (x SAS)							
SO249-DR67-2	1. Rock Type: sediment, mud 2. Size: 16x13x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: creamy white 5. Texture / Vesicularity: mud 9. Encrustations: no crust 10. Comment: local sediment								
SO249-DR67-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR68

Emperor Seamounts. NE-SW striking ridge at W margin of Hanzei. SE facing slope where ridge connects with Hanzei guyot

Dredge on bottom UTC 30/06/16 21:04hrs, lat 49°59.41'N, long 167°21.72'E, depth 4247 m

Dredge off bottom UTC 30/06/16 22:52hrs, lat 49°59.90'N, long 167°21.34'E, depth 3389 m

total volume: few rocks

Comments: Mn crust with volcaniclastic sediment (-1) attached; most likely the only insitu volcanic rock of the dredge. Small fragments of Ol bearing lava are present in the volcanicalstic matrix and could be separated after coarse crushing. Similarly Plg-Px phyric basalt fragments are present as lithics in volcaniclastic sample -4. Lava fragments -2 and -3 are fresh and angular but appear petrographically different from each other. Their insitu origin is thus questionable. Priority: Lava fragments in volcaniclastics -1 and -4.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR68-1	1. Rock Type: volcaniclastic, highly altered 2. Size: 53x36x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: red, pink and grey 5. Texture / Vesicularity: poorly sorted with angular clasts; clasts: altered glass (red, 15%, 3mm); lithics (15%, 2-40mm); crystals (7%,<1mm); clasts of olivine-basalt(!), fresh Plg in basaltic clasts!, fresh Spinel in altered olivine 10. Comment: this sample was attached to a large block of Mn crust and is therefore insitu	x		2			MSC_SK	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR68-2	1. Rock Type: volcanic 2. Size: 10x7x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Px (15%, 3mm) 7. Matrix: dense, fine grained, Plg in groundmass 10. Comment: samples -2 and -3 are a group of fresh angular volcanic rocks that could be insitu based on angularity but proof requires detailed geochemical characterization and age dating	x	x						
SO249-DR68-3	1. Rock Type: volcanic 2. Size: 9x9x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, 1% vesicles, some vesicles are filled with yellow and green material, others are filled with black material 6. Phenocrysts: Px (15%, 2mm), Amph (1%, <1mm) 7. Matrix: fine grained 10. Comment: Presence of Px and Amph to checked by TS	x	x						
SO249-DR68-4	1. Rock Type: volcaniclastic 2. Size: 10x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: red-brown 5. Texture / Vesicularity: poorly sorted with angular clasts, lithics (20%, 2-40mm) Plg (15%, 2mm), Px (2%, <1mm) 10. Comment: the geochemistry bloc of this sample is mostly a large volcanic clast with altered Plg and Px phenocrysts.	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR68-5	1. Rock Type: sedimentary 2. Size: 11x6x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted, fine grained sand	x							
SO249-DR68-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR69

Emperor Seamounts. NW facing slope of ridge at the W side of Hanzei, ca 5nm NW of DR68. Uppermost section below ridge crest

Dredge on bottom UTC 01/07/16 02:51hrs, lat 50°01.65'N, long 167°12.73'E, depth 3403 m

Dredge off bottom UTC 01/07/16 04:21hrs, lat 50°01.14'N, long 167°13.04'E, depth 3004 m

total volume: few rocks

Comments: a few small rock fragments (igneous, sediments). All are likely dropstones, as all are different (granites, dolerites). Samples: -1 to -3 = basalts, -4 to -5 = sandstones/claystones

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR69-1	1. Rock Type: volcanic 2. Size: 9x7x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: moderate grey 5. Texture / Vesicularity: porphyritic, no vesicles, some vening up to 2 mm 6. Phenocrysts: Px (3-6 mm, 20%), Plg (0.5-1 mm, 5%), a few phenocrysts have Px + Plg together 7. Matrix: fine grained 8. Secondary Minerals: white filling in veins, Qtz 9. Encrustations: thin Fe-Mn coating 10. Comment: likely a dropstone	x					MSC_SK	TS by Airfreight, GC taken out	
SO249-DR69-2	1. Rock Type: intrusive, dolerite?, fresh 2. Size: 11x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium-dark-grey 5. Texture / Vesicularity: massive, medium fine grained 7. Matrix: all grains < 1 mm; Plg and Px? 9. Encrustations: thin Fe coating 10. Comment: likely a dropstone	x							
SO249-DR69-3	1. Rock Type: metamorphic, altered tuff? 2. Size: 10x5x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark reddish grey, some tan and lighter grey 5. Texture / Vesicularity: brecciated, appears to be fragments of altered volcanic material (pumice, mineral grains) cemented together grains/clasts are subrounded to angular 1-15 mm 7. Matrix: fine grained dark grey-black material 8. Secondary Minerals: Fe oxides, Chl + zeolithe? All fragments appear to be altered 9. Encrustations: thin Mn-Fe coating 10. Comment: likely a dropstone	x							
SO249-DR69-4	1. Rock Type: sedimentary, sandstone 2. Size: 9x8x2 cm 3. Shape / Angularity: pale greenish-brownish grey 4. Color of cut surface: subrounded 5. Texture / Vesicularity: very fine sand, massive 7. Matrix: sand cemented together with some mud. Appears to have fairly large fraction (>20%) of Fsp + other none Qz fragments. Needs TS to confirm 9. Encrustations: thin Fe-Mn coating	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR69-5	1. Rock Type: sedimentary (sandstone + mudstone) 2. Size: 10x4x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-brown, tan 5. Texture / Vesicularity: tan mudstone: possibly contains some very fine sand, massive grey-brown; medium sand, massive 7. Matrix: mudstone; very fine, but contains some red (Fe-oxide?)+black (Mn-oxide) grains (may be secondary); Sand: mostly Plg?, some Fe-oxide grains, also contain minor Qz+Kfsp 8. Secondary Minerals: some weathering of Fsp, also Fe-Mn deposits along thin fractures, mostly in mud portion 9. Encrustations: Mn rind, 1-3 mm 10. Comment: sharp boundary between sand and mud parts	x							
SO249-DR69-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR70

Emperor Seamounts; Hanzei. W rim of the plateau. Track across plateau edge.

Dredge on bottom UTC 01/07/16 08:45hrs, lat 50°01.02'N, long 167°30.52'E, depth 3685 m

Dredge off bottom UTC 01/07/16 10:09hrs, lat 50°01.53'N, long 167°30.44'E, depth 3278 m

total volume: 1/4 full

Comments: Thick Fe-Mn crusts, one large basaltic breccia of CPx basalt and several angular to rounded rocks: basalts, andesites with Amph, granite, jasper. Semisolidified sediments. One rounded pumice of rhyolite. Priority: -1 to -6 basalts (possibly insitu rocks), -8 rhyolite pumice.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR70-1	1. Rock Type: volcanic, Cpx-Ol phyric basalt, strongly altered from large bloc of CPx phyric basalt breccia 2. Size: 32x28x14 cm from boulder L 3. Shape / Angularity: angular 4. Color of cut surface: dark green 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Cpx up to 5-7mm, 20-30%; Ol 3mm, ≤5% 7. Matrix: fine grained, Cpx (~40%); Ol (~5-10%); Plg (5-10%); others secondary 8. Secondary Minerals: Actinolite + Chl + Qtz (veins) 9. Encrustations: Fe-Mn crust ≤ 3mm 10. Comment: Cpx, Ol geochemistry, possibly insitu	x (xSAS)	x		Cpx-Ol		MSC_SK	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR70-2	1. Rock Type: volcanic, vesicular basalt, low degree of alteration 2. Size: 11x8x4 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: dark green 5. Texture / Vesicularity: vesicular, 20-25% 7. Matrix: fine grained, Plg + CPx, very fine grained matrix, rare small Plg needles 8. Secondary Minerals: possible Fe-oxides 9. Encrustations: Fe-Mn crust ~2mm 10. Comment: possibly insitu	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR70-3	1. Rock Type: volcanic, CPx-Ol phyric basalt, medium degree of alteration 2. Size: 11x8x4 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: green 5. Texture / Vesicularity: porphyric 6. Phenocrysts: CPx (~3mm), Ol (2-3mm), others matrix 7. Matrix: fine grained, CPx (15%), Ol (5-10%), Plg (15-20%) 8. Secondary Minerals: Actinolite + Chl 9. Encrustations: Fe-Mn crust, 1-2mm 10. Comment: Ol-Cpx geochemistry, possibly insitu	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR70-4	1. Rock Type: volcanic, vesicular basalt, low degree of alteration 2. Size: 9x7x4 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: vesicular, vesicles (20%) aligned parallel to flow direction 7. Matrix: fine grained, Plg+CPx in groundmass 8. Secondary Minerals: Fe-oxided 9. Encrustations: Fe-Mn crust ~1mm 10. Comment: possibly insitu	x	x						
SO249-DR70-5	1. Rock Type: volcanic, Px-Plg-Ol subporphyric basalt 2. Size: 17x8x7 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: subporphyric 6. Phenocrysts: Px (10%, 2-4mm); Ol (≤5%, 2mm); Plg (~10%, ~3mm) 7. Matrix: fine grained, Px (20%), Plg (25%), Ol (5-10%), others secondary phases 8. Secondary Minerals: Act + Chl 9. Encrustations: Fe-Mn crust, 2mm 10. Comment: possibly insitu	x	x						
SO249-DR70-6	1. Rock Type: volcanic, aphyric basalt, low degree of alteration 2. Size: 17x8x7 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric, very fine grained, dense 7. Matrix: very fine grained, CPx, Plg, Ol, all very small 8. Secondary Minerals: ±Act ±Chl 9. Encrustations: Fe-Mn crust 10. Comment: possibly insitu	x	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR70-7	1. Rock Type: sedimentary, most representative from this location 2. Size: 17x10x7 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: grey beige 5. Texture / Vesicularity: massive 7. Matrix: massive 8. Secondary Minerals: clay minerals 9. Encrustations: Fe-Mn crust, ~2mm 10. Comment: fossils?	x					x		
SO249-DR70-8	1. Rock Type: volcanic, pumice 2. Size: 16x11x4 cm 3. Shape / Angularity: rounded 4. Color of cut surface: pink-white 5. Texture / Vesicularity: highly vesicular 6. Phenocrysts: Plg, OPx, CPx, Mt (sum <1-2%) 7. Matrix: glassy 10. Comment: origin? EMPA on glass	x (x MP)			Gl, Plg, Opx, CPx, Mt				
SO249-DR70-9-Mn	1. Rock Type: sedimentary (Fe-Mn crust) 2. Size: from boulder Z, 32x28x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: black 5. Texture / Vesicularity: massive 7. Matrix: massive 8. Secondary Minerals: Fe-Mn oxides and hydroxides 9. Encrustations: itself, Fe-Mn crust ~20-30cm thick								no picture taken
SO249-DR70-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR71

Emperor Seamounts; Suizei: Northern margin of the guyot, upper 400m

Dredge on bottom UTC 01/07/16 14:45hrs, lat 49°48.07'N, long 167°47.82'E, depth 2960 m

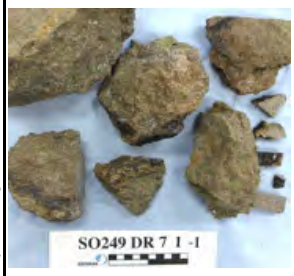
Dredge off bottom UTC 01/07/16 16:14hrs, lat 49°48.07'N, long 167°47.81'E, depth 2469 m

total volume: 1/2 full

Comments: Several large blocs; most of them granites, gabbros, sediment and shist. Lots of various sediment, all of which were assigned to be ice rafted material. A single large bloc (-1) is a vesicular, reddish oxidized lava fragment indicating subaerial eruption / exposure consistent with the island stage of Suizei guyot. The lava contains Plg, Px and altered Ol phenocrysts and is the only sample that is certainly insitu.

Basalt samples -2 to -8 are of questionable origin. They are all Plg-Px (sometimes fresh Ol in -4) phyric in variable amounts and proportions and range from angular to subangular. Alteration is from fresh to medium altered. Sample -3 contains a small intrusive xenolith that is included in the TS billet. Priority: -1 whole rock chemistry despite high degree of alteration. Mineral chemistry of -1 should be also checked along with suitability of Plg for Ar-Ar dating. Sample -2 to -8 require detailed TS petrography to determine commons and differences. Then it will take major and trace element geochemistry to unravel an intraplate origin.

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR71-1	1. Rock Type: volcanic, strongly altered, reddish oxidized, green filling of vesicles 2. Size: 35x29x22 cm 3. Shape / Angularity: subangular 4. Color of cut surface: purple-red 5. Texture / Vesicularity: porphyritic, ~10% vesicles (partially filled with green secondary mineral, Cu-oxide?) 6. Phenocrysts: Plg (15%, 1mm), altered Ol (3%, 2mm), Px (1%, 3mm) 7. Matrix: fine grained, Plg + Ol 8. Secondary Minerals: Iddingsite after Ol 10. Comment: Some Ol has fresh cores. The angularity, size + red oxidation of this rock indcate it erupted subaerially consistent with the dredge being carried out along the flanks of a large guyot	x	x	check for suitable mineral content			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR71-2	1. Rock Type: volcanic, basalt, fresh 2. Size: 12x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2%, 2mm) 7. Matrix: fine grained, Plg 8. Secondary Minerals: few white veins 10. Comment: this sample has fresh Plg	x	x	2					
SO249-DR71-3	1. Rock Type: volcanic, mostly altered with fresh core 2. Size: 16x13x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: dense, Px? in groundmass 8. Secondary Minerals: alteration halo (~1-4cm), few white veins 10. Comment: within the fresh core is a fine grained intrusive xenolith (~1cm). This xenolith is included in the thin section billet. The geochemistry slab is mostly from the fresh core but requires careful picking	x	x						
SO249-DR71-4	1. Rock Type: volcanic, fresh 2. Size: 17x13x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (3%, 1mm), Ol (2%, 1mm), Px (1%, 2mm) 7. Matrix: dense, Plg + Ol +Px 9. Encrustations: Mn crust ≤1mm 10. Comment: this is the only sample from this dredge with fresh olivine	x	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR71-5	1. Rock Type: volcanic, fresh 2. Size: 12x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 2mm) 7. Matrix: dense + fine grained. Plg + Px (?) 8. Secondary Minerals: alteration halo ~2mm 9. Encrustations: Mn crust (≤1mm) 10. Comment: samples -5 to -9 are somewhat similar in that they are angular to subangular Plg phyric lavas, though they represent a range in alteration	x	x						
SO249-DR71-6	1. Rock Type: volcanic 2. Size: 15x10x6 cm 3. Shape / Angularity: sub angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (7%, 1mm), Px (10%, 2mm) 7. Matrix: dense fine grained, Plg + Px 10. Comment: alteration halo 1-3 cm	x	x						
SO249-DR71-7	1. Rock Type: volcanic 2. Size: 15x12x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (1%, 1mm), Px (2%, 1mm) 7. Matrix: dense, fine grained. Plg + Px in groundmass 8. Secondary Minerals: white veins	x	x						
SO249-DR71-8	1. Rock Type: volcanic 2. Size: 15x12x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (10%, 3mm), Px (1%, 1mm) 7. Matrix: dense, fine grained, Plg + Px in groundmass 10. Comment: most Plg and Px is altered reddish-brown	x							
SO249-DR71-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR72

Emperor Seamounts; Suizei: small flat topped, posterosional cone on plateau of Suizei. Track from base to top along southern

Dredge on bottom UTC 01/07/16 20:15hrs, lat 49°44.28'N, long 167°51.37'E, depth 2639 m

Dredge off bottom UTC 01/07/16 21:14hrs, lat 49°44.57'N, long 167°51.19'E, depth 2331 m

total volume: empty

Comments: no bites at all, only very minor at the beginning of the haul

SO249-DR72-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR73

Emperor Seamounts; Suizei: SW margin beneath plateau edge at steepest section

Dredge on bottom UTC 02/07/16 02:18hrs, lat 49°34.44'N, long 167°48.77'E, depth 3230 m

Dredge off bottom UTC 02/07/16 03:56hrs, lat 49°34.97'N, long 167°48.80'E, depth 2764 m

total volume: very few rocks, hole in chain bag at bottom

Comments: although lots of good bites in first half of dredge haul only dropstones were collected. These were pebble sized plutonics and subangular sediments. Dropstone criteria were absence of Mn crust, no alteration halos in cut section. Thus no samples were taken.

SO249-DR73-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR74

Emperor Seamounts; Suizei: E slope, half way between SO201 DR45 and DR44,

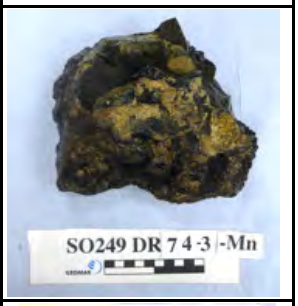
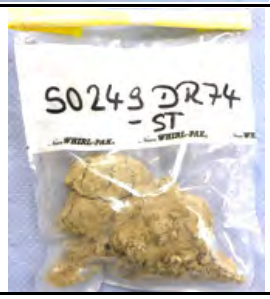
Dredge on bottom UTC 02/07/16 10:03hrs, lat 49°37.47'N, long 168°33.47'E, depth 3871 m

Dredge off bottom UTC 02/07/16 11:27hrs, lat 49°37.41'N, long 168°32.59'E, depth 3395 m

total volume: 1/4 full

Comments: Mostly Fe-Mn crust, one large bloc of meta-conglomerate, few consolidated sediments, diabase clasts in breccia (-1) are most likely insitu

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR74-1	1. Rock Type: sediment; breccia lithoclastic 2. Size: 31x28x7 cm bloc L 3. Shape / Angularity: slightly angular 4. Color of cut surface: green 5. Texture / Vesicularity: cataclastic, brecciated 7. Matrix: fine grained 8. Secondary Minerals: all minerals secondary except some relics in diabase litholclasts 9. Encrustations: Fe-Mn crust 2-3mm 10. Comment: the diabase lithoclasts may have some potential age dating, probably insitu.	x		Plg from diabase clasts			MSC_SK	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR74-2	1. Rock Type: volcanic, vesicular Plg-CPx phyric basalt 2. Size: 11x7x6 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, 40% vesicles 6. Phenocrysts: Plg (3mm, 10-15%), CPx (4mm, 10%) 7. Matrix: fine grained, groundmass Plg (40%) and Px (50%) 8. Secondary Minerals: ± clay minerals 9. Encrustations: Fe-Mn crust, 3mm 10. Comment: initu origin questionable	x							
SO249-DR74-3 Mn	1. Rock Type: sedimentary, Fe-Mn crust 2. Size: 20x15x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: black 5. Texture / Vesicularity: massive 7. Matrix: massive 8. Secondary Minerals: all material are of chemogenic origin 9. Encrustations: total thickness 15-20 cm								
SO249-DR74-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR75

Emperor Seamounts; Suizei: E slope, just S of SO201 DR44, beneath plateau edge

Dredge on bottom UTC 02/07/16 15:39hrs, lat 49°43.93'N, long 168°33.97'E, depth 3378 m

Dredge off bottom UTC 02/07/16 16:54hrs, lat 49°44.24'N, long 168°33.41'E, depth 2960 m

total volume: mud + few rocks

Comments: Ol-Plg ± CPx lava fragments with fairly similar petrography inbetween individual pieces. All have subangular shapes and some appear to posess chilled margins indicating eruption in water. These rocks are definitely insitu and may stem from the submarine shield phase of Suizei. The Plg may be suitable for age dating but K contents should be checked by EMP before as other rocks from this area have extreme low K contents (SO201 DR44). Other rocks were two rounded, plutonic dropstones along with solidified, ice rafted sediments. Priority: -1 through -4 for geochemistry and possible Ar-Ar age dating of Fsp phenocrysts. Overall this site confirms exposure of insitu rocks in the NE corner of Suizei.

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR75-1	1. Rock Type: volcanic, moderately fresh with a slight reddish alteration rim 2. Size: 9x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, partly brown / reddish alteration staining 5. Texture / Vesicularity: porphyric, small mostly open vesicles. If filled then with brown material 6. Phenocrysts: altered Ol (1-2mm, 3-5%), Fsp whitish grey (1-4mm, 5%) 7. Matrix: fine grained 8. Secondary Minerals: iddingsite after Ol, brown filing of vesicles 9. Encrustations: 2-3mm Mn crust 10. Comment: apparently freshest sample of dredge. All other samples (-2 to -8) and archive (-9X + 10X) belong petrographycally to the same lithology	x	x	1 (Fsp)			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR75-2	1. Rock Type: volcanic, moderately fresh but more altered than -1 2. Size: 17x9x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to dark grey, brownish oxidized alteration rim ~1cm; could be a chilled margin 5. Texture / Vesicularity: porphyric, 2-3% vesicles (ø 1mm, open) some up to ø 5mm 6. Phenocrysts: altered Ol (1-3mm, 5%, orange), few almost idiomorphic Fsp (1-4mm, 7%, whitish grey) 7. Matrix: fine grained 8. Secondary Minerals: see -1 9. Encrustations: see -1 10. Comment: petrographically similar to -1	x	x	1 (Fsp)			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR75-3	1. Rock Type: volcanic, with possible chilled margin, strongly altered 2. Size: 17x13x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish-brown to dark grey 5. Texture / Vesicularity: porphyric, 1% vesicles ≤1mm, some up to 2mm, open 6. Phenocrysts: altered Ol (1-4mm, 2-3%), few almost idiomorphic, Fsp whitish grey, beige in altered rim of sample 7. Matrix: fine grained 8. Secondary Minerals: iddingsite, beige altered Fsp, few filled fractures (brown) 9. Encrustations: see -1 10. Comment: largest sample but overall higher degree of alteration. Petrographically similar to -1 & -2. May posess a chilled margin without fresh glass	x	x	check Fsp quality					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR75-4	1. Rock Type: volcanic, similar to -3 2. Size: 14x12x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: see -3 5. Texture / Vesicularity: porphyric, few larger holes (by dissolution?) up to 1cm, irregular shaped, partly filled with beige material. Other vesicles << 1mm, partly filled with dark grey material 6. Phenocrysts: altered Ol (1-3mm, 2-3%, orange, some hypidiomorphic), Fsp (1-4mm, ~10%, whitish grey, few beige altered) 7. Matrix: fine grained 8. Secondary Minerals: iddingsite, few beige alterations, some dark grey vesicle fillings 10. Comment: chilled margin, 1xTS of chilled margin similarl to -3 but higher degree of alteration in rim	x	x						
SO249-DR75-5	1. Rock Type: volcanic, moderately fresh, fresher than -3 and -4 2. Size: 7x8x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium dark grey 5. Texture / Vesicularity: porphyritic, few vesicles <1mm, <1% filled with dark grey material 6. Phenocrysts: altered Ol (<1-2mm, 1-2%, orange), Fsp (<1-3mm, 2-3%, whitish grey, some beige altered) 7. Matrix: fine grained 8. Secondary Minerals: iddingsite, beige altered Fsp, dark grey vesicle filing	x							
SO249-DR75-6	1. Rock Type: volcanic, moderately fresh 2. Size: 8x5x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, few vesicles (<<1mm, < 1%) --> some filled with dark grey material 6. Phenocrysts: altered Ol (<1-2mm, 2-3%, orange), Fsp (<1-3mm, 3-5%, some beige altered, whitsh grey when fresh) 7. Matrix: fine grained 8. Secondary Minerals: see sample -5	x					MSC_SK	TS by Airfreight, GC taken out	
SO249-DR75-7	1. Rock Type: volcanic, moderately fresh 2. Size: 7x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey (slightly brownish) 5. Texture / Vesicularity: porphyritc, 10-15% vesicles (1-5mm), few partly filled with dark grey material 6. Phenocrysts: altered Ol (1-4mm, 2-3%), Fsp (greyish white, 1-3mm, 2-3%) 7. Matrix: fine grained 8. Secondary Minerals: see other samples 10. Comment: largest vesicles of all samples	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR75-8	1. Rock Type: volcanic, moderately fresh 2. Size: 7x6x3 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, vesicles slightly grouped together 6. Phenocrysts:Fsp (<1-3mm, 2%, greyish white) 7. Matrix: fine grained 10. Comment: sole sample without Ol and thus different petrography. Consider dropstone origin	x							
SO249-DR75-9X	1. Rock Type: multiple small samples similar to -1 & -2								
SO249-DR75-10X	1. Rock Type: multiple small samples similar to -3 & -4 but higher degrees of alteration								
SO249-DR75-ST	no sediment taken from trap								no sediment taken from trap

SO249-DR76

Emperor Seamount province; Seamount 70nm E of Hanzei. Cone at northen slope. Track along N facing slope along steepest part

Dredge on bottom UTC 03/07/16 02:43hrs, lat 50°16.92'N, long 169°56.29'E, depth 3341 m

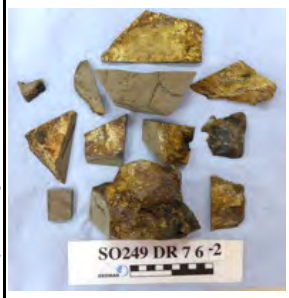
Dredge off bottom UTC 03/07/16 04:23hrs, lat 50°16.41'N, long 169°56.35'E, depth 2822 m

total volume: 1/6 full with angular basalt fragments

Comments: Pillow lava fragments, sometimes with fresh glass margins. Ol-phyric basalts, amount of Ol ranging from 0-20%, up to 8 mm. Ol altered and replaced by Fe-oxides throughout. Also numerous ice rafted debris (granites, solidified sediments) in rounded and angular varieties.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR76-1	1. Rock Type: volcanic, Ol-porphyric basalt, strongly altered / oxidized) 2. Size: 16x11x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: reddish-grey 5. Texture / Vesicularity: porphyric, slightly vesicular 6. Phenocrysts: Ol (up to 7 mm, 15%) 7. Matrix: Fine grained with chilled rims, composed of Pl and Px 8. Secondary Minerals: Fe-oxides and hydroxides 9. Encrustations: Fe-Mn crust <2mm 10. Comment: fresh glass (!) to determine primary melt composition	x	x	x glass?	x		MSC_SK	TS+GC by Airfreight	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR76-2	1. Rock Type: volcanic, Ol-porphyric basalt, less altered / oxidized than -1 2. Size: 14x13x18 cm 3. Shape / Angularity: pillow, partly angular 4. Color of cut surface: pale-grey 5. Texture / Vesicularity: porphyric, less vesicular than -1 6. Phenocrysts: Ol (up to 5 mm, <10%) 7. Matrix: Very fine grained Ol+Gl, Pl and Px 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust <1.5mm 10. Comment: fresh glass (!) to determine primary melt composition	x	x	x glass?	x		MSC_SK	TS by Airfreight, GC taken out	
SO249-DR76-3	1. Rock Type: volcanic, Ol-porphyric basalt, altered / oxidized 2. Size: 12x10x4 cm 3. Shape / Angularity: pillow, partly angular 4. Color of cut surface: pale-grey 5. Texture / Vesicularity: porphyric, vesicularity 10-15% 6. Phenocrysts: Ol (up to 5 mm, 15-20%) 7. Matrix: Very fine grained Pl and Px 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust ~4mm 10. Comment: fresh glass (!) to determine primary melt composition	x	x	x glass?	x				
SO249-DR76-4	1. Rock Type: volcanic, Ol-porphyric basalt, altered / oxidized 2. Size: 12x10x6 cm 3. Shape / Angularity: fragment of pillow, partly angular 4. Color of cut surface: grey 5. Texture / Vesicularity: subporphyric, vesicularity 10-15%, very small vesicles 6. Phenocrysts: Ol (< 3 mm, 25%), badly preserved 7. Matrix: very fine grained Pl and Px 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust ~4mm 10. Comment: fresh glass (!) to determine primary melt composition	x	x	x glass?					
SO249-DR76-5	1. Rock Type: volcanic, Ol-porphyric basalt, medium degree of alteration (Ol-oxidation) 2. Size: 15x10x4 cm 3. Shape / Angularity: partly angular 4. Color of cut surface: coloration is following pillow shape (dark green-brownish grey) 5. Texture / Vesicularity: porphyric, vesicularity follows pillow zonation with less vesicles in the inner part 6. Phenocrysts: Ol (oxidized) up to 7 mm, 5-10% 7. Matrix: fine grained Ol (Px and Plg in Matrix) 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust ca 3 mm 10. Comment: fresh glass	x	x		x		MSC_SK	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR76-6	1. Rock Type: volcanic, Ol-porphyric basalt, strongly alteration (Ol-oxidation completley) with glass 2. Size: 12x10x6 cm 3. Shape / Angularity: partly angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric, low vesicularity, <3% 6. Phenocrysts: Ol (5mm, 20%) 7. Matrix: fine grained: Ol, Px, Plg 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust ca 2 mm 10. Comment: glass, primary melt	x	x		x				
SO249-DR76-7	1. Rock Type: Volcanic. Ol-porphyric basalt, strongly altered, pillow fragment 2. Size: 10x9x3 cm 3. Shape / Angularity: partly angular 4. Color of cut surface: reddish grey 5. Texture / Vesicularity: porphyric, vesicularity, <5%, very small vesicles 6. Phenocrysts: Ol, altered, up to 8 mm, 15-20% 7. Matrix: fine grained: Ol , Px (in Matrix) 8. Secondary Minerals: Fe-oxides 9. Encrustations: Fe-Mn crust ca 3 mm 10. Comment: glass	x	x		x				
SO249-DR76-8	1. Rock Type: volcanic, Ol-porphyric basalt, partly alterated 2. Size: 13x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: reddish grey, medium grey 5. Texture / Vesicularity: porphyric, vesicularity, 3-5%, very small vesicles, <1 mm 6. Phenocrysts: Ol: altered, up to 1-2 mm, 10-15% 7. Matrix: fine grained 8. Secondary Minerals: Fe-oxides, some vesicles have purple coating 9. Encrustations: thin Fe-Mn coat	x	x						
SO249-DR76-9	1. Rock Type: volcanic, alterted Ol basalt with chilled margin that may contain fresh glass 2. Size: 9x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey 5. Texture / Vesicularity: porphyric, vesicularity, 5%, <1 mm 6. Phenocrysts: Ol, altered, <1 mm, 5% 7. Matrix: fine grained 8. Secondary Minerals: Fe-oxides, one vein filled with Mn oxide 9. Encrustations: Mn crust up to 4 mm 10. Comment: entire sample packed as glass				x				
SO249-DR76-10	1. Rock Type: volcanic, alterated, Ol porphyritic basalt 2. Size: 12x8x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium brown to reddish grey 5. Texture / Vesicularity: porphyric, vesicularity, 10-15%, <1 mm 6. Phenocrysts: Ol, altered, 1 mm, <5% 7. Matrix: fine grained 8. Secondary Minerals: Fe-Mn-oxides, 9. Encrustations: thin Mn-Fe coating 10. Comment: glass				x				

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR76-11	1. Rock Type: volcanic, Ol-porphyric basalt, alterted 2. Size: 10x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey to tan 5. Texture / Vesicularity: porphyric, vesicularity, 10-15%, <1 mm 6. Phenocrysts: Ol, altered, up to 1 mm, 5-10% 7. Matrix: fine grained 8. Secondary Minerals: Fe-Mn-oxides, dendrites around fine fractures. Some vesicles have light grey blue or yellowish coatings (zeolithes?) 9. Encrustations: thin Fe-Mn coatings 10. Comment: possible glass on the outside?	x	x						
SO249-DR76-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR77

Emperor Seamount province; Seamount 70nm E of Hanzei. Lower part of the southern slope

Dredge on bottom UTC 03/07/16 10:25hrs, lat 50°05.76'N, long 169°55.74'E, depth 4136 m

Dredge off bottom UTC 03/07/16 11:52hrs, lat 50°06.20'N, long 169°55.75'E, depth 3680 m

total volume: few rocks

Comments: One potentially insitu rock fragment; Px-Plg basalt

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR77-1	1. Rock Type: volcanic,Px-phyric basalt, altered 2. Size: 18x12x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium pinkish grey 5. Texture / Vesicularity: porphyric, no vesicles 6. Phenocrysts: Px (10-15%, 1-5mm, altered) 7. Matrix: Plg (30-40%, 1-3mm, altered) 8. Secondary Minerals: pink white minerals replacing Plg 9. Encrustations: thin Fe-Mn coating 10. Comment: strongly altered Px phenocrysts; phenocrysts appear to be Px-Plg glomerocrysts	x (x SAS)	x	1-2					
SO249-DR77-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR78

Emperor Seamount province; Seamount 70nm E of Hanzei. Second, smaller volcano in the SE. Track along S facing slope

Dredge on bottom UTC 03/07/16 10:25hrs, lat 50°0.36'N, long 170°12.00'E, depth 3130 m

Dredge off bottom UTC 03/07/16 11:52hrs, lat 50°0.82'N, long 170°12.00'E, depth 2615 m

total volume: 1/6 full, four large boulders

Comments: Most rocks of this dredge are clearly dropstones, very rounded and crystal rich andesites with Fsp and Amph. All other strongly rounded rocks were also discarded as ice rafted debris. A large Mn crust contained two angular Ol phyric pillow basalt fragments. These are the only igneous rocks with true insitu origin (-1A and -1B). Additional lava fragments (-2 to -4) were angular to subangular, are Plg phyric but based on their fairly thin Mn coating are likely dropstones.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR78-1A	1. Rock Type: volcanic, altered Ol phyric pillow basalt fragment recovered as clast from within large Mn crust (S) 2. Size: Mn crust, boulder S; 51x39x25 cm. Sample -1A, 10x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: porphyric, vesicles (<1mm, 10%) partly filled with yellow material 6. Phenocrysts: Ol (<3mm, 5%, altered to iddingsite) 7. Matrix: fine grained 8. Secondary Minerals: Ol completely altered to iddingsite; cracks filled and lined with Mn 9. Encrustations: Mn crust up to 1cm 10. Comment: only magmatic rocks that are certainly insitu, as they are angular clasts within a thick Mn-crust	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR78-1B	1. Rock Type: volcanic, altered Ol phyric pillow basalt fragment recovered as clast from within large Mn crust (S) 2. Size: Mn crust, boulder S; 51x39x25 cm. Sample -1B, 8x7x4 cm. More throroughly altered than -1A. 3. Shape / Angularity: angular 4. Color of cut surface: red-brown, very little grey 5. Texture / Vesicularity: porphyric, vesicles (<0.5mm, <7%), partly filled with yellow material 6. Phenocrysts: Ol (<4mm, ~3%, altered to iddingsite) 7. Matrix: fine grained 8. Secondary Minerals: Ol completely altered to iddingsite; cracks filled and lined with Mn, partly dendritic 9. Encrustations: Mn crust few mm 10. Comment: see -1A but more altered						MSC_SK	TS by Airfreight, GC taken out	
SO249-DR78-2	1. Rock Type: volcanic rock 2. Size: 8x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, vesicles (<1%, <4mm) 6. Phenocrysts: Fsp (<3mm, <5%), black minerals (~2%, max. 2mm) 7. Matrix: dense 8. Secondary Minerals: black minerals partly altered to red color, vesicles filled with greenish blue material 9. Encrustations: Mn crust up to few mm 10. Comment: besides -1 most angular rock of dredge but very different petrography, thus most likeley a dropstone								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR78-3	1. Rock Type: volcanic 2. Size: 14x10x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (<5mm, <25%), black minerals (<2mm, <5mm) 7. Matrix: dense 8. Secondary Minerals: Fsp partially altered to yellow 9. Encrustations: patchy Mn crust (few mm) 10. Comment: highly Fsp bearing; dropstone?								
SO249-DR78-4	1. Rock Type: volcanic 2. Size: 8x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric, vesicles due to mineral alteration 6. Phenocrysts: Fsp (<5mm, 10-15% 7. Matrix: dense 8. Secondary Minerals: minerals partly altered to yellow and partly to secondary vesicles, unfilled cracks 9. Encrustations: patchy Mn cracks (few mm) 10. Comment: see sample -3 but more altered, dropstone?								
SO249-DR78-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR79

Tenji Smt. NE-SW striking large ridge away from guyot, interpreted as rift arm. NE most tip where a fault appears to to ruptured the slope. Track along SE facing slope along steepest section.

Dredge on bottom UTC 04/07/16 02:45hrs, lat 49°22.94'N, long 169°51.20'E, depth 4504 m

Dredge off bottom UTC 04/07/16 04:13hrs, lat 49°23.36'N, long 169°51.04'E, depth 4059 m

total volume: Empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR79-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR80

Tenji Smt. NE-SW trending ridge, southern slope, lower part

Dredge on bottom UTC 04/07/16 09:28hrs, lat 49°17.79'N, long 169°42.90'E, depth 4701 m

Dredge off bottom UTC 04/07/16 10:52hrs, lat 49°18.19'N, long 169°42.77'E, depth 4174 m

total volume: Few rocks

Comments: Two fragments of pillow lavas from breccia cemented by Mn-Fe hydroxides and clay are very likely insitu. One large block of metasediment and several small dropstones. Priority: -1 and -2 are good for chemistry. -2 contains Plg phenocrysts suitable for Ar-Ar dating.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR80-1	1. Rock Type: volcanic, basaltic pillow-lava fragment with low degree of alteration. Recovered as clasts from Mn encrusted breccia / slope talus 2. Size: 13x8x7 cm 3. Shape / Angularity: angular, section of pillow 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric, very low vesicularity 6. Phenocrysts: rare Ol (~2 mm, 2%) 7. Matrix: fine grained; Plg-CPx 50:50 8. Secondary Minerals: Fe oxides after OL 9. Encrustations: Fe-Mn crust 4-5 mm 10. Comment: good for geochemistry	1	1	1-2 GM			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR80-2	1. Rock Type: volcanic, pillow-lava fragment from breccia. Plg-Ol basalt, low degree of alteration 2. Size: 13x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: Ol-Plg phyric, very low vesicularity 6. Phenocrysts: rare OL (up to 5 mm, 2%), Plg ≤3-4 mm, ≤5% 7. Matrix: fine grained; Pl-CPx 50:50 8. Secondary Minerals: Fe oxides and Cc after Ol 9. Encrustations: Fe-Mn crusts and fillings in vesicles 10. Comment: good for geochemistry; Ol altered, Plg fresh and good for Ar/Ar	1	1	1 Plg	Plg		MSC_SK	TS+GC by Airfreight	
SO249-DR80-3	1. Rock Type: volcanic breccia, basaltic lithoclasts cemented by Mn-Fe and clay material 2. Size: 13x8x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey+black+brownish 5. Texture / Vesicularity: clastic, brecciated 7. Matrix: brecciated 8. Secondary Minerals: all matrix of breccia composed of secondary minerals (clay, Fe-oxides) 9. Encrustations: Fe-Mn crust ~3mm								
SO249-DR80-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR81

Tenji Smt. Upper part of the E slope, ~9nm NNW of SO209-1b_DR2; beneath plateau edge

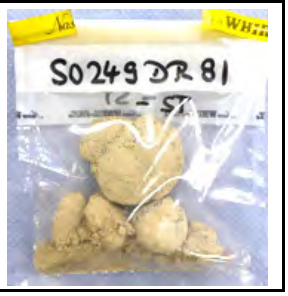
Dredge on bottom UTC 04/07/16 18:13hrs, lat 48°44.33'N, long 169°15.16'E, depth 3139 m

Dredge off bottom UTC 04/07/16 19:58hrs, lat 48°43.90'N, long 169°14.68'E, depth 2614 m

total volume: corals and few rocks

Comments: Eight igneous rocks overall. Sample -8 lava fragment recovered as clast from Mn crust is the only rock that is doubtless insitu. Samples -1 to -3, although similar in Px-Plg phenocryst phases (in variable amounts and sizes) but with thin to absent Mn coating are very likely dropstones and thus should be analyzed with extreme caution, if at all. Sample -6 initially descibed as volcaniclstic with glass is more likely a pyroxenite with large, partially altered Px crystals. Again a dropstone origin is most likely. Despite its high degree of alteration priority sample is -8 (!) as it is the only insitu igneous rock recovered from a Mn crust.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR81-1	1. Rock Type: volcanic, moderately fresh 2. Size: 9x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium to dark grey 5. Texture / Vesicularity: basically aphyric with microphenocrysts, dense matrix 6. Phenocrysts: green mineral (Cpx?, <1mm, 2-3%), black mineral (Amph?, sub mm, <1%), Fsp (mostly sub-mm needles, 2%) 7. Matrix: fine grained 8. Secondary Minerals: browish-red alteration of green mineral 9. Encrustations: patches of Mn on outside 10. Comment: basically an aphyric lava with mircrophenocrysts that is basically similar to more porphyric sample -2	x	x						
SO249-DR81-2	1. Rock Type: volcanic, moderately fresh 2. Size: 11x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium to dark grey with large greenish phenocysts (CPx?) 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: greenish-white, sometimes black (CPx?, 1-3mm, 15%), Fsp (<1mm, 5%) 7. Matrix: fine grained 9. Encrustations: see -1 10. Comment: sample is simlar to -1 but has significant larger amounts of phenocrysts that are also bigger	x	x						
SO249-DR81-3	1. Rock Type: volcanic, moderately fresh 2. Size: 8x7x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium to dark grey 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: greenish-whitish minerals (CPx?, 1-2mm, 7-10%), Fsp (<1mm, 3-5%) 7. Matrix: fine grained 9. Encrustations: see -1 10. Comment: sample is similar to -1 and -2	x	x						
SO249-DR81-4	1. Rock Type: volcanic, slightly altered 2. Size: 11x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey in center, light grey to brownish alteration halo (~1.5cm) aong rim 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: black minerals (Amph?, 1-3mm, 5%), Fsp (1-3mm, 3-5% 7. Matrix: fine grained 10. Comment: sample is unique; dropstone	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR81-5	1. Rock Type: volcanic, moderately fresh 2. Size: 7x7x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, 7% vesicles (1-5mm), partly filled with brown material 6. Phenocrysts: small sub-mm Fsp needles 7. Matrix: fine grained 8. Secondary Minerals: brownish vesicle filling 10. Comment: sample is unique in this dredge; dropstone	x							
SO249-DR81-6	1. Rock Type: volcaniclastic, moderately fresh, could be also a pyroxenite 2. Size: 10x6x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey clasts, brownish veins, partly black rim 5. Texture / Vesicularity: grey aphyric volcanic parts divided by brownish veins, that also cross cut black rim 6. Phenocrysts: grey "clasts" could be large Px crystals 7. Matrix: fine grained 8. Secondary Minerals: brownsh veins 10. Comment: black rim around grey volcanic clasts could be chilled margin.	x							
SO249-DR81-7	1. Rock Type: volcanic, relatively fresh 2. Size: 11x9x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium to dark grey 5. Texture / Vesicularity: porphyric dense 6. Phenocrysts: brownish minerals (Px?, <1-2mm, 3-5%), possibly sub-mm Fsp needles 7. Matrix: fine grained 10. Comment: very rounded; likely a dropstone	x							
SO249-DR81-8	1. Rock Type: volcanic, strongly altered, angular lava fragment from within Mn crust 2. Size: 8x7x5 cm, Mn criust (25x14x9 cm) 3. Shape / Angularity: subangular 4. Color of cut surface: greyish-brown with whitish brown veins 5. Texture / Vesicularity: porphyric dense 6. Phenocrysts: Fsp (1-2mm) and small sub-mm needles 7. Matrix: fine grained 8. Secondary Minerals: brownish white veins 9. Encrustations: several cm thick Mn crust, removed with hammer 10. Comment: most important sample of dredge because it contains the only igneous rocks of prooven insitu origin		(x)				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR81-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Appendix 2 (Leg1 Station Details and Rock Description)

SO249-DR82

Tenji Smt. Eastern part at N-S striking seamount / ridge. SW facing slope above large circular basin witin Tenji. Mid section of slope

Dredge on bottom UTC 05/07/16 02:19hrs, lat 48°27.53'N, long 169°52.21'E, depth 4417 m

Dredge off bottom UTC 05/07/16 04:02hrs, lat 48°27.91'N, long 168°52.69'E, depth 3913 m

total volume: empty

Comments: a large (50cm), ± intact deep sea cephalopod at the bottom of the chain bag

SO249-DR82-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR83

Tenji Smt. NE-SW striking ridge in the W part of the seamount. Southern slope

Dredge on bottom UTC 05/07/16 12:02hrs, lat 48°24.77'N, long 167°54.15'E, depth 4923 m

Dredge off bottom UTC 05/07/16 13:32hrs, lat 48°24.77'N, long 168°54.51'E, depth 4432 m

total volume: one rock

Comments: dropstone

SO249-DR83-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR84

Tenji Smt. W flank, mid section at steepest part

Dredge on bottom UTC 05/07/16 21:18hrs, lat 48°55.04'N, long 168°02.91'E, depth 3903 m

Dredge off bottom UTC 05/07/16 22:38hrs, lat 48°55.02'N, long 168°03.65'E, depth 3499 m

total volume: two platy rock fragments

Comments: one 3-5 cm thick Mn crust with mud attached, one ø7cm Mn knoll

SO249-DR84-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR85

Krusenstern Fracture Zone: Southern part SW of Tenji Seamount. SW facing slope along a small nose from base to top

Dredge on bottom UTC 06/07/16 09:48hrs, lat 48°32.07'N, long 167°09.67'E, depth 6005 m

Dredge off bottom UTC 06/07/16 11:24hrs, lat 48°32.46'N, long 167°10.11'E, depth 5513 m

total volume: two rocks

Comments: Two rocks, diorite and sandstone of questionable origin. Most likley dropstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR85-1	1. Rock Type: intrusive, diorite, very fresh 2. Size: 13x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: pale grey 5. Texture / Vesicularity: granoblastic (granitic) 7. Matrix: medium grained, Qtz (25%), Plg (40%), Px (20%), Phl (5%) 8. Secondary Minerals: not visible 9. Encrustations: Fe-Mn crust, 2mm 10. Comment: most likely a dropstone								
SO249-DR85-2	1. Rock Type: meta-sediment, sandstone 2. Size: 22x12x6 cm 3. Shape / Angularity: slightly angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: micro-granoblastic 7. Matrix: fine grained, Plg +Qtz ±Px(Di)								
SO249-DR85-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR86

Kuzenstern Fracture Zone: SW facing slope along its lower section

Dredge on bottom UTC 06/07/16 22:19hrs, lat 49°17.67'N, long 166°20.18'E, depth 5905 m

Dredge off bottom UTC 06/07/16 23:59hrs, lat 48°18.10'N, long 166°20.52'E, depth 5365 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR86-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-CTD87

Kusenstern Fracture Zone

CTD Start UTC 07/07/16 02:31hrs, lat 49°17.67'N, long 166°20.52'E, depth 5369 m

CTD on deck UTC 07/07/16 04:06hrs, lat 48°18.11'N, long 166°20.52'E, depth 5355 m

max depth of CTD: 2000m

Comments: CTD for EM122 calibration

SO249-DR88

Krusenstern Fracture Zone: middle part, E of Suizei Seamount, NE facing slope from bottom to top

Dredge on bottom UTC 07/07/16 31:21hrs, lat 49°24.78'N, long 166°16.32'E, depth 5189 m

Dredge off bottom UTC 07/07/16 14:51hrs, lat 49°24.47'N, long 166°16.07'E, depth 4668 m

total volume: 1/4 full

Comments: This is a fairly homogeneous dredge of aphyric ocean floor lavas that comprises pillows and pillow fragments along with greenish-yellowish hyaloclastite. Sample -1 to -5 are a fine grained variety of aphyric lava of which -1 to -3 contain minor amounts of fresh glass along chilled margins. Sample -6 to -9 are also aphyric but coarser while -10 and -11 are more altered varieties to cover the full range of alteration. -12 and -13 are hyaloclastites of which -12 may possibly contain remnants of fresh glass. -16 is a lava fragment that had a 1-2 cm thick Mn crust all around, is fairly fresh and contains few % of Plg phenocrysts which may be suitable for Ar-Ar dating. -14x and -15x are poorly sorted sediments.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR88-1	1. Rock Type: volcanic, basalt, moderately altered 2. Size: 33x25x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg and altered Ol in groundmass 8. Secondary Minerals: Iddingsite after Ol and yellowish-green veins 9. Encrustations: Mn crust ≤1mm 10. Comment: there is a chilled margin with minor fresh (?) glass. There are brown (oxidized?) cores within the rock. Sample -1 to -5 are a group of aphyric basalts that are more fine grained the group of samples -6 through -9	x	x	1-2	Gl		MSC_SK	TS+GC by Airfreight	
SO249-DR88-2	1. Rock Type: volcanic (basalt), moderately altered 2. Size: 20x15x15 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, 1% vesicles, some filled with black or red-brown material 7. Matrix: fine grained, Plg 8. Secondary Minerals: red-brown veins 9. Encrustations: Mn crust ≤1mm 10. Comment: There is a chilled margin with minor fresh (?) glass. There are brown (oxidized?) cores within the rock.	x	x		Gl				
SO249-DR88-3	1. Rock Type: volcanic (basalt), moderately altered 2. Size: 9x6x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, 1% vesicles, some filled with red-brown material or white material 7. Matrix: fine grained, Plg + altered Ol 8. Secondary Minerals: iddingste after Ol, red-brown veins 9. Encrustations: Mn crust ≤1mm 10. Comment: There is a chilled margin with possible minor fresh (?) glass.	x	x		Gl				

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR88-4	1. Rock Type: volcanic, basalt, mildly altered 2. Size: 15x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg + altered Ol 8. Secondary Minerals: iddingste after Ol, few red-brown veins 9. Encrustations: Mn crust ≤1mm	x	x						
SO249-DR88-5	1. Rock Type: volcanic, basalt, moderately altered 2. Size: 15x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, ~1% vesicles, some fllled with red-brown material 7. Matrix: fine grained, Plg + altered Ol 8. Secondary Minerals: iddingste after Ol, few red-brown veins 9. Encrustations: Mn crust ≤2mm	x	x						
SO249-DR88-6	1. Rock Type: volcanic, basalt, mildly altered 2. Size: 20x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, dense 7. Matrix: medium grained, Plg + altered Ol 8. Secondary Minerals: some Ol altered to iddingsite, few red-brown veins 9. Encrustations: Mn crust ≤1mm 10. Comments: samples -6 to -9 are a group of aphyric basalts that are more coarse grained than group -1 to -5 samples	x	x				MSC_SK	TS+GC by Airfreight	
SO249-DR88-7	1. Rock Type: volcanic, basalt, moderately altered 2. Size: 10x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, dense 7. Matrix: medium grained, Plg + altered Ol 8. Secondary Minerals: some Ol altered to iddingsite few red-brown veins 9. Encrustations: Mn crust ≤1mm	x	x						
SO249-DR88-8	1. Rock Type: volcanic (basalt), moderately altered 2. Size: 14x13x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: aphyric, ~1% vesicles, some filled with red brown material 7. Matrix: medium grained, Plg 8. Secondary Minerals: few red-brown veins 9. Encrustations: Mn crust ≤2mm	x	x						

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR88-9	1. Rock Type: volcanic (basalt), altered 2. Size: 14x12x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey + brown 5. Texture / Vesicularity: aphyric 7. Matrix: medium grained, Plg + altered Ol 8. Secondary Minerals: iddingsite after Ol, few red-brown veins 9. Encrustations: Mn crust ≤2mm	x							
SO249-DR88-10	1. Rock Type: volcanic, highly altered 2. Size: 15x7x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey + brown 5. Texture / Vesicularity: porphyritic, ~1% vesicles, filled with red brown material 6. Phenocrysts: Plg (3%, 2mm) 7. Matrix: fine grained, Plg + altered Ol 8. Secondary Minerals: red brown veins + iddingsite after Ol 9. Encrustations: Mn crust (≤1mm) 10. Comment: taken to cover full range of alteration	x							
SO249-DR88-11	1. Rock Type: volcanic (basalt), altered 2. Size: 12x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey + brown 5. Texture / Vesicularity: aphyric, ~1% vesicles 7. Matrix: fine grained, Plg 10. Comment: similar to samples -1 to -5	x	x						
SO249-DR88-12	1. Rock Type: volcaniclastic, hyaloclastite, strongly altered but may contain remnants of fresh glass 2. Size: 16x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: red brown + green 5. Texture / Vesicularity: clasts range from 1-30mm 7. Matrix: mostly alterd glass shards, but some fresh glass appears preserved inbetween clasts 8. Secondary Minerals: palagonite 9. Encrustations: Mn crust (<1mm) 10. Comment: -12 and -13 are simlar but 12 is less altered with possibly fresh glass in places								
SO249-DR88-13	1. Rock Type: volcaniclastic, hyaloclastite, strongly altered but may contain remnants of fresh glass 2. Size: 20x11x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: red brown + green 5. Texture / Vesicularity: clasts range from 1-30mm 7. Matrix: mostly alterd glass shards, but some fresh glass appears preserved inbetween clasts 8. Secondary Minerals: palagonite 9. Encrustations: Mn crust (<2mm) 10. Comment: more altered than -12								
SO249-DR88-14X	1. Rock Type: poorly sorted sediment 2. Size: 14x11x9 cm								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR88-15X	1. Rock Type: poorly sorted sediment 2. Size: 12x6x8 cm								
SO249-DR88-16	1. Rock Type: volcanic (basalt), fresh with red brown veins 2. Size: 14x10x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, dense 6. Phenocrysts: Plg (1mm, 7%), Px (1mm, 1%) 7. Matrix: dense 9. Encrustations: Mn crust 1-2 cm going around entire specimen, removed with hammer	x	x	2	Plg		MSC_SK	TS+GC by Airfreight	
SO249-DR88-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR89

Krusenstern F.Z.; ca. 60 nm NW of DR88. Ridge ca. 8 nm NE of main fault line. NE dipping steep slope, from base to top.

Dredge on bottom UTC 08/07/16 01:56 hrs, lat 50°10.20'N, long 165°38.40'E, depth 5012 m

Dredge off bottom UTC 08/07/16 03:31hrs, lat 50°17.89'N, long 165°37.96'E, depth 4565 m

total volume: few rocks

Comments: Several small fragments of Ol-Plg phyric pillow basalts (samples -1 to -6). One large block of granite (no sample taken). About 20 small dropstones of diverse magmatic and sedimentary rocks of which -7 to -11 were taken as representative types.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR89-1	1. Rock Type: volcanic, Ol-Plg phyric basalt, high degree of alteration 2. Size: 12x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric, no vesicles 6. Phenocrysts: Ol up to 25%, 4mm; Plg 10-15%, 4 mm 7. Matrix: intersertal texture; Plg-Px=50:50; fresh 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 2 mm 10. Comment: Ar/Ar - Plg	x	x	Plg			MSC_SK	TS by Airfreight, GC taken out	

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR89-2	1. Rock Type: volcanic, Ol-Plg phyric basalt, medium degree of alteration (oxydation), less porphyric 2. Size: 11x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric, no vesicles 6. Phenocrysts: Plg up to 15%, 5 mm; Ol 5%, 3mm and significantly less abundant than in -1 7. Matrix: intersertal texture; Plg (30%), Px(30%), Ol (40%) 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 2 mm 10. Comment: Ar/Ar - Plg	x	x	Plg					
SO249-DR89-3	1. Rock Type: volcanic, Ol-Plg phyric basalt, medium degree of alteration, low phenocryts abundance 2. Size: 12x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: porphyric, less pronounced than in previous samples, 2% vesicles 6. Phenocrysts: Plg 5%, up to 5 mm; rare Ol <3%, 2-3mm 7. Matrix: intersertal texture; Plg (40%), Ol (40%), Px (20%) 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 3 mm 10. Comment: Ar/Ar - Plg	x	x	Plg					
SO249-DR89-4	1. Rock Type: volcanic, Plg-Ol phyric basalt with abundant Ol (strongly oxidized) 2. Size: 13x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: porphyric, <1% vesicles 6. Phenocrysts: Plg 5%, up to 5 mm 7. Matrix: intersertal texture; Plg (<10%), Px (10-15%) 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 3 mm	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR89-5	1. Rock Type: volcanic, very simlar to -4, Plg-Ol phyric basalt, moderately altered 2. Size: 12x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: porphyric, intersertal (partly sceletal), no vesicles 6. Phenocrysts: Plg 5-10%, up to 7 mm, slightly altered 7. Matrix: intersertal texture; Plg (<25%), Px (40%), Ol (±5%) 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 2 mm 10. Comment: Ar/Ar - Plg	x	x	Plg					
SO249-DR89-6	1. Rock Type: volcanic, Plg-Ol phyric basalt, moderately altered (oxidized) 2. Size: 9x7x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: porphyric, no vesicles 6. Phenocrysts: Plg 10%, 3 mm, Ol (5%, 2-3mm) 7. Matrix: intersertal; Plg-Px-Ol 8. Secondary Minerals: Fe oxides after Ol 9. Encrustations: Fe-Mn crust ca. 2 mm 10. Comment: Ar/Ar - Plg	x		Plg					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR89-7	1. Rock Type: metasedimentary rock with suspiceous looking sedimentary? features on outside of rock. Very angular for a potential dropstone 2. Size: 30x10x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine grained sandstone 7. Matrix: fine grained Qtz ±Act ±Chl ±Px 8. Secondary Minerals: all minerals are secondary 9. Encrustations: very thin Mn oxide crust 10. Comment: it is necessary to check petrography in thin section	x (x SAS)							
SO249-DR89-8	1. Rock Type: volcanic, Plg-phyric basalt, moderately altered 2. Size: 9x5x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: Plg (10-15%, 3-4mm) 7. Matrix: fine grained, Plg-Px (50:50) groundmass 8. Secondary Minerals: ±Chl, Qtz 9. Encrustations: Fe-Mn crust (1-2mm) 10. Comment: dropstone for reference, Ar-Ar on Plg possible	x (x SAS)							
SO249-DR89-9	1. Rock Type: volcanic, Andesite-basalt, Plg-Amph phyric 2. Size: 12x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: almost black 5. Texture / Vesicularity: porphyric, low vesicuarity, open vesicles 6. Phenocrysts: Plg (10%, 3mm), Amph (<5%, 2mm) 7. Matrix: fine grained, slightly vesicular 8. Secondary Minerals: relatively fresh 9. Encrustations: Fe-Mn crust, ~2mm 10. Comment: dropstone for reference, Ar-Ar on Plg-Hbl possible	x							
SO249-DR89-10	1. Rock Type: volcanic, subvolcanic dolerite, low degree of alteration 2. Size: 8x6x6 cm 3. Shape / Angularity: slightly altered 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: doleritic 7. Matrix: fine grained, Pl+CPx (40:50), others secondary 8. Secondary Minerals: Chl, Act 9. Encrustations: Fe-Mn crust	x							
SO249-DR89-11	1. Rock Type: completely hydrothermally overprinted mafic rocks (perhaps basalt) 2. Size: 18x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: granoblastic 7. Matrix: medium grained, Chl, Cc ±Act ±Qtz ±Py 8. Secondary Minerals: rock is composed of secondary minerals 9. Encrustations: oxide crust only	x (x SAS)							

SO249-DR89-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR90

Krusenstern F.Z.; ridge ca. 8 nm NE of main fault line. NE dipping steep slope, ca 1.5nm NW of DR89, from base to top.

Dredge on bottom UTC 08/07/16 08:54 hrs, lat 50°20.34'N, long 165°38.66'E, depth 5256 m

Dredge off bottom UTC 08/07/16 10:21hrs, lat 50°19.97'N, long 165°38.26'E, depth 4703 m

total volume: few rocks

Comments: A relatively large bloc of rare Ol-phyric basalt (-1), Ol is altered. Sample -2, -3 and -5 are Ol-Plg phyric basalts with large Plg that appears suitable for dating. Somewhat more altered than -1. Sample -4 are small fragments of aphyric basalt in Fe-Mn crust. Dredge provided 3 distinct lavas ranging from Ol to Plg-Ol to aphyric. All appear to be insitu.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR90-1	1. Rock Type: volcanic, Ol-Phyric basalt, altered 2. Size: 31x16x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brownish grey, dark grey 5. Texture / Vesicularity: porphyric, non-vesicular 6. Phenocrysts: Plg (~1mm, 1-2%, altered), Ol (0.5-1mm, 10-15%) 7. Matrix: very fine grained, Pg 8. Secondary Minerals: light brown fracture fill 9. Encrustations: thin Fe-Mn coating 10. Comment: less altered (more grey) sections should be chosen for geochemical analysis	x	x	2-3			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR90-2	1. Rock Type: volcanic, Ol-Plg phyric basalt, somewhat altered 2. Size: 10x8x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-brownish grey 5. Texture / Vesicularity: porphyritic, slightly vesicular (<1%, ≤1mm, filled with back material) 6. Phenocrysts: Plg (1-5 mm, 5-7%, fresh; Ol(?) (0.5-1mm, 3-5%, altered) 7. Matrix: very fine grained, Plg 8. Secondary Minerals: tan fracture fill 9. Encrustations: thin Fe-Mn coanting	x	x	2					
SO249-DR90-3	1. Rock Type: volcanic, Plg-Ol phyric basalt, somewhat altered 2. Size: 8x6x3 cm 3. Shape / Angularity: anguar 4. Color of cut surface: medium brown grey 5. Texture / Vesicularity: porphyric, non vesicular 6. Phenocrysts: Plg (1-5mm, 15-20%, altered), Ol(?, 2-3mm, 1-2%, altered) 7. Matrix: fine grained, Plg, Ol 8. Secondary Minerals: zeolite replacing Plg 9. Encrustations: thin Fe-Mn crust 10. Comment: entire sample set for GC slab and TS billets	x	x	3					

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR90-4	1. Rock Type: conglomerate, basalt clasts in Mn matrix 2. Size: 8x6x3 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey / dark brown 5. Texture / Vesicularity: aphyric basalt clasts 7. Matrix: very fine grained 8. Secondary Minerals: none observed 9. Encrustations: Mn coating 0.5-2cm	x	x	2					
SO249-DR90-5	1. Rock Type: volcanic, Plg phyric basalt 2. Size: 4x3x2 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Plg (2-6mm, 5-7%, altered 7. Matrix: fine grained, radiating crystal clusters 8. Secondary Minerals: none observed 9. Encrustations: thin Fe-Mn coating								
SO249-DR90-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR91

Ocean cust inbetween Krusenstern and n.N. F.Z. Oval shaped basin NE of a larger seamount (mapped but not sampled). NNE facing

Dredge on bottom UTC 09/07/16 01:47hrs, lat 49°54.53'N, long 163°35.26'E, depth 5743 m

Dredge off bottom UTC 09/07/16 03:15hrs, lat 49°54.08'N, long 163°35.09'E, depth 5362 m

total volume: few dcm sized blocs

Comments: A large bloc of fresh Px phyric basalt, angular dropstone (-1). Fe-Mn hydroxide crust only insitu rock. -2 is a ø 4cm aphyric basalt fragment from the Mn crust. -3 Fe-Mn crust with numerous small fragments of aphyric basalts, altered to yellow but can contain fresh Plg.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR91-1	1. Rock Type: volcanic, Px phyric lava, fresh, dropstone! 2. Size: 32x15x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey, black, dark reddish 5. Texture / Vesicularity: porphyritic, no vesicles 6. Phenocrysts: Px (10-15%, 1-2mm); Amph (3%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: Fe-oxides?, dark reddish areas 9. Encrustations: thin Fe-Mn coat 10. Comment: Part of bloc L; most likely a dropstone								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR91-2	1. Rock Type: volcanic, altered 2. Size: 8x5x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish brown 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg altered (3-5%, ~1mm), Ol altered (1%, <1mm) 7. Matrix: fine grained, looks like interlocking acicular crystal of Plg + Px 8. Secondary Minerals: Chl after Plg, Fe-oxides after Ol. Thin veins with Mn oxide lining and extensive Mn dendrites 10. Comment: only insitu igneous rock recovered from Mn crust. Entire sample taken for TS and GC						MSC_SK	TS by Airfreight, GC taken out	
SO249-DR91-3	1. Rock Type: hyaloclastic breccia cemented with Fe-Mn crust 2. Size: part of bloc N, 37x27x27 cm 10. Comment: lithoclasts same as described above (-2). Some with amorphous silica. Small fragments of completely altered glass (light green, 5-12 mm). All clasts are angular to subangular 3-4cm. Matrix contains very fine sand + silt and is tan. Mn dendrites throughout. All volcanic material has been altered at low temperature.								
SO249-DR91-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR92

Seamount on ocean crust inbetween Krusenstern and n.N. F.Z. Working name "Gummi Bear" Seamount based on bathymeric shape.

Dredge on bottom UTC 09/07/16 11:06hrs, lat 50°04.03'N, long 163°02.08'E, depth 5043 m

Dredge off bottom UTC 09/07/16 12:14hrs, lat 50°03.71'N, long 163°01.77'E, depth 4674 m

total volume: 1/4 full

Comments: Pillow lava fragments, few dropstones. Aphyric to rare Plg phyric basalts; altered hyaloclastites. Priority according to increasing degree of alteration -1, -2, -4, -5, -7, -8, -9. -7 contains large fresh Plg and -10 has fresh glass

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR92-1	1. Rock Type: volcanic, pillow lava, basalts, minor alteration 2. Size: 22x11x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, non vesicular 6. Phenocrysts: very rare Plg phenocrysts (<1%, ~1-1.5mm) 7. Matrix: intersertal, fine to medium grained 8. Secondary Minerals: minor oxidation 9. Encrustations: oxidation, Mn along fractures, ~0.5mm Mn crust on surface 10. Comment: Very fresh; good for GC and Ar-Ar; Fe-Mn oxides along veins / cracks should be avoided	x	x	1			MSC_SK	TS by Airfreight, GC taken out	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR92-2	1. Rock Type: similar to -1 2. Size: 11x8x5 cm 10. Comment: very fresh except a few veins with Fe-Mn oxides; very good for GC and Ar-Ar	x	x	1					
SO249-DR92-3	1. Rock Type: volcanic, pillow lava fragment, rare Plg phyric basalt 2. Size: 16x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to yellowish grey 5. Texture / Vesicularity: massive, no vesicles 6. Phenocrysts: rare (<1% Plg up to 3mm) 7. Matrix: glassy altered to intersertal (from rim towards inner part). Inner part is very similar to -1 and -2 8. Secondary Minerals: oxidation 9. Encrustations: thin Mn crust on surface, some Mn and Fe oxides along fractures 10. Comment: pretty fresh, particularly in more crystallized inner part. Good for GC, Ar-Ar?	x	x	?					
SO249-DR92-4	1. Rock Type: similar to -1; Plg up to 5mm fresh 2. Size: 10x9x6 cm 10. Comment: very good for GC, Ar-Ar. Perhaps slightly more oxidized compared to -1	x	x	1					
SO249-DR92-5	1. Rock Type: volcanic, aphyric basalt similar to -1 but more altered 2. Size: 15x11x9 cm 8. Secondary Minerals: outer alteration halo ~1cm and along cracks. Inner cores are somewhat oxidized but irregularly 10. Comment: somewhat more altered than -1. Good for GC if minor veins are picked out	x	x	?					
SO249-DR92-6	1. Rock Type: volcanic, aphyric basalt, similar to -1 & -2 2. Size: 13x10x5 cm 7. Matrix: fine crystallized intersertal groundmass. Veins oriented in one direction 10. Comment: Overalls the most altered compared to -1 through -5. Requires careful picking of grey freshest parts.	x	x	?					

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR92-7	1. Rock Type: volcanic, Plg phyric basalt, pillow lava, slightly altered 2. Size: 17x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: massive no vesicles 6. Phenocrysts: Plg ~2-3% up to 5mm, fresh 7. Matrix: hyaloplitic az pillow margin to intersertal in central part 8. Secondary Minerals: oxidation, some Fe-Mn hydroxides along cracks and 0.5mm on surface 9. Encrustations: see above 10. Comment: The most porhyritic of the above described samples. Somewhat oxidized in marginal part and along fractures. Good for GC if oxidized part avoided. Plg appears easy to separate for Ar-Ar.	x	x	1 Plg					
SO249-DR92-8	1. Rock Type: volcanic, aphyric basalt, pillow lava fragment 2. Size: 13x7x5 cm 10. Comment: similar to -7, very fine crystallized groundmass. Good for GC in central parts. Mn (black) should be carefully picked from crushed rock before analysis.	x	x						
SO249-DR92-9	1. Rock Type: volcanic, aphyric basalt with very rare Plg phenocrysts, pillow lava segment 2. Size: 11x9x5 cm 10. Comment: petrographically similar to -8. Fairly fresh, good for GC. Black incrustations, Fe-Mn hydroxides should be avoided	x	x						
SO249-DR92-10	1. Rock Type: volcanic, aphyric basalt with fresh glass! 2. Size: 13x6x5 cm 10. Comment: petrographycally similar to -9. Sector of a pillow with chilled rim and ±fresh central part. GC slab from center.	x	x		glass		MSC_SK	out	
SO249-DR92-11	1. Rock Type: Fe-Mn hydroxide crust 2. Size: 16x10x6 cm 10. Comment: layered; black Fe-Mn outside (~3cm) and clay with rare palagonite grains (~3cm)								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR92-12	1. Rock Type: volcanic, completely altered hyaloclastite 2. Size: 23x11x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light green (pistacio green) 5. Texture / Vesicularity: clastic 8. Secondary Minerals: palagonite after glass 10. Comment: sample for demonstration, not suitable for GC								
SO249-DR92-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR93

"Gummi Bear" Seamount. 7 nm south of DR92 along ENE facing slope in lower section

Dredge on bottom UTC 09/07/16 16:58hrs, lat 49°56.81'N, long 163°04.72'E, depth 5251 m

Dredge off bottom UTC 09/07/16 18:22hrs, lat 49°56.45'N, long 163°04.23'E, depth 4824 m

total volume: 1/4 full

Comments: Pillow lava and pillow lava fragments, all fairly altered except more coarse grained varieties (core of pillows?). Sparsely Plg microphenocrysts. Yellowish green, coarse grained and unsorted hyaloclastite, totally altered. The largest hyaloclastite bloc N contained an angular, strongly altered Plg phyric basalt fragment (-8). No fresh glass detected on abundant chilled margins. Sample suite divided into medium (-1 to -4) and fine grained varieties (-5 to -7).

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR93-1	1. Rock Type: volcanic, relativey fresh, only thin alteration rim 2. Size: 10x8x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric, no vesicles 6. Phenocrysts: Plg microphenocrysts (<1%, ~1mm) 7. Matrix: medium grained, Plg whitish grey, Px black 8. Secondary Minerals: mm thin alteration rim (orange-brown), some altered minerals in matrix 10. Comment: freshest sample of DR93	x	x	3			MSC_SK	TS by Airfreight, GC taken out	
SO249-DR93-2	1. Rock Type: volcanic, relatively fresh, alteration halo up to 3mm, orange brown 2. Size: 11x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, slightly lighter than -1 5. Texture / Vesicularity: aphyric, no vesicles 6. Phenocrysts: Plg microphenocrysts <1%, ~1mm 7. Matrix: medium grained, white-grey, black matrix similar to -1 10. Comment: not as fresh as -1, otherwise very similar	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR93-3	1. Rock Type: volcanic, moderately altered, alteration halo up to 4mm, minerals in matrix altered brown 2. Size: 19x12x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium to brownish grey 5. Texture / Vesicularity: aphyric, dense 6. Phenocrysts: sparse Plg <1%, <1-5mm 7. Matrix: medium grained, brown-beige-whitish. groundmass made up of Plg and Px 8. Secondary Minerals: orange alteration rim, orange brown altered minerals. Black Mn linings along fractures and rim								
SO249-DR93-4	1. Rock Type: volcanic, moderately to strongly altered 2. Size: 13x8x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish to medium grey 5. Texture / Vesicularity: aphyric, dense 6. Phenocrysts: Plg <1%, <1mm altered 7. Matrix: medium grained, Plg + Px making up groundmass 8. Secondary Minerals: orange alteration rim, yellowish microphenocrysts maybe altered minerals 10. Comment: this is the most coarse grained sample from which groundmass Plg maybe separated for Ar-Ar dating								
SO249-DR93-5	1. Rock Type: volcanic, moderately to strongly altered, up to 3cm alteration halo and patchy altered parts in the interior 2. Size: 18x17x17 cm 3. Shape / Angularity: angular to subangular 4. Color of cut surface: light medium grey 5. Texture / Vesicularity: aphyric, dense 6. Phenocrysts: Plg microphenocrysts, white to light grey, some idiomorph, 1% up to 1-5mm 7. Matrix: fine grained black grey 8. Secondary Minerals: orange altered minerals, black dentritic Mn, also along fractures 10. Comment: a lot of alteration, requires careful preparation for geochemistry								
SO249-DR93-6	1. Rock Type: volcanic, pillow with chilled margin, highly altered with minor fresh parts 2. Size: 27x19x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish orange grey 5. Texture / Vesicularity: aphyric, no vesicles 6. Phenocrysts: Plg microphenocrysts <1%, <1mm 7. Matrix: fine grained 8. Secondary Minerals: brownish-orange alteration rim & up to core of rock, cracks with denritic Mn 10. Comment: chilled margin with hydrated glass								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR93-7	1. Rock Type: volcanic, moderately to strongly altered, cm thick orange rim, dentritic Mn along fractures 2. Size: 13x10x9 cm 3. Shape / Angularity: angular to subangular 4. Color of cut surface: medium to dark grey with orange-brownish alteration 5. Texture / Vesicularity: aphyric no vesicles 6. Phenocrysts: Plg microphenocrysts <1%, up to 1mm 7. Matrix: fine grained 8. Secondary Minerals: see -6 10. Comment: pillow lava, hydrated glassy rim & hyaloclastite attached								
SO249-DR93-8	1. Rock Type: volcanic, moderately to highly altered. Recovered from wihin hyaloclastite bloc N (36x29x27 cm) 2. Size: 11x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brown, medium grey 5. Texture / Vesicularity: porphyric, dense 6. Phenocrysts: Plg, 3-5%, 1-3mm 7. Matrix: fine grained, altered matrix minerals 8. Secondary Minerals: Mn dentrites along cracks, several colored alteration rims 10. Comment: rock piece from within hyaloclastite								
SO249-DR93-8	1. Rock Type: hyaloclastite, piece from bloc N (36x29x27 cm) 2. Size: 11x8x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish-yellowish, some black fragments 7. Matrix: very coarse grained, unsorted 8. Secondary Minerals: totally altered								
SO249-DR93-9X	1. Rock Type: similar to sample -1 to -3 2. Size: 15x12x12 cm								
SO249-DR93-10X	1. Rock Type: similar to sample -7, hydrated glass 2. Size: 8x7x5 cm 10. Comment: taken to also cover very altered rocks to characterize subduction input								
SO249-DR93-11X	1. Rock Type: similar to sample -4 to -6, two pieces 2. Size: 14x9x7 cm; 11x11x9 cm 10. Comment: taken to also cover very altered rocks to characterize subduction input								

SO249-DR93-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR94

Ocean floor between Krusenstern and N.N. Fracture Zone. Southern margin of NW-SE elongated basin steeply dipping north facing

Dredge on bottom UTC 10/07/16 3:37hrs, lat 49°21.66'N, long 163°20.93'E, depth 5246 m

Dredge off bottom UTC 10/07/16 05:03hrs, lat 49°21.27'N, long 163°20.53'E, depth 4707 m

total volume: three rocks

Comments: relatively fresh (moderately altered) rare Ol-Px-Plg phyric basalts (diabases). One small pebble - dropstone.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR94-1	1. Rock Type: volcanic; rare Ol-Px-Plg phyric basalt / diabase, moderately altered 2. Size: 21x15x11 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish grey to brown 5. Texture / Vesicularity: massive; no vesicles 6. Phenocrysts: total amount ≤5%; Ol ~≤1-2% <2 mm altered); Px<1% bottle green diopside ca.2 mm fresh; Plg ≤2-3% up to 4 mm (partly fresh) 7. Matrix: doleritic texture; Px/Plag = 50:50, medium grained 8. Secondary Minerals: Oxidation; Fe-oxides after Ol; Chl-Act after glass. some fillings along fractures 9. Encrustations: about 1 mm outer Mn crust; some black Mn dots in the inner parts 10. Comment: moderately altered basalt; still good for chemistry, perhaps Ar-Ar dating on Plg phenocrysts. The sample maybe fragment of massive sheet lava flow or dyke	X + SAS	X	2	Pl Px		MSC_SK	TS+GC by Airfreight	
SO249-DR94-2	1. Rock Type: similar to -1 2. Size: 20x17x6 cm 3. Shape / Angularity: subangular Some differences to -1 due to dark grey core parts in the sample. These parts may be least altered compared to brown matrix or less oxydized (?). The sample is about the same quality as sample -1 and maybe good for chemistry. Fe-Mn hydroxides should be avoided when prepared for chemical analysis	X + SAS	X	1-2	Pl Px				
SO249-DR94-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR95

Ocean floor between Krusenstern and N.N. Fracture Zone. E-W trending ridge bordering deep depression at its southern margin, N facing deep slope, lower part, ~5nm W of DR94

Dredge on bottom UTC 10/07/16 9:50hrs, lat 49°23.08'N, long 163°13.56'E, depth 5720 m

Dredge off bottom UTC 10/07/16 11:11hrs, lat 49°22.74'N, long 163°13.46'E, depth 5183 m

total volume: few rocks

Comments: two Mn nodules, one flat plate of granodiorite dropstone(?)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR95-1	1. Rock Type: intrusive, granodiorite, maybe Plg gneiss, low degree of alteration 2. Size: 16x11x1.5 cm 3. Shape / Angularity: angular, a few flat plates 4. Color of cut surface: bluish grey 5. Texture / Vesicularity: granoblastic 7. Matrix: medium grained, Plg (40%), Amph (30%), Qtz (20%) ±Px (10%)? 8. Secondary Minerals: possible Act 9. Encrustations: Fe-Mn oxide crust (<2mm) 10. Comment: possible dropstone but very specific shape; freshly broken off fron larger boulder(?). Questionable setting	x (x_SAS)							
SO249-DR95-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR96

Ocean floor between Krusenstern and N.N. Fracture Zone. Depression S of "Gummi Bear" seamount. N edge of one of the NW-SE striking abyssal hills that are bended eastward into the trough

Dredge on bottom UTC 10/07/16 16:15hrs, lat 49°30.54'N, long 163°08.20'E, depth 5758 m

Dredge off bottom UTC 10/07/16 17:21hrs, lat 49°30.22'N, long 163°08.18'E, depth 5420 m

total volume: few rocks

Comments: Rocks with certain insitu origin are Plg phyric lava fragments from a Mn crust (-1A through -1C). Sample -2 is a larger lava fragment with similar petrography as -1 and thus very likely insitu. An aphyric lava (-3) recoverd from a bloc of solidified mud. Sample -4 is a very unusual, pillar shaped shist that appears to have undergone ductile deformation. Insitu oirgin is unclear but likely as rock is very angular.

Appendix 2 (Leg1 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR96-1A	1. Rock Type: volcanic, moderately altered, clast recovered from Mn crust 2. Size: 6x5x5 cm from bloc H (17x17x11 cm) 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (1%, 1mm) 7. Matrix: fine grained, Plg & altered Ol 8. Secondary Minerals: iddingsite after Ol in groundmass 10. Comment: this sample is similar to -1B and -2. Samples 1A through -1C were removed from a bloc of Mn crust	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR96-1B	1. Rock Type: volcanic, moderately altered clast recovered from Mn crust 2. Size: 3x3x3 cm from bloc H (17x17x11 cm) 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (1%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: iddingsite after Ol 10. Comment: this sample is similar to -1A and -2. It was removed from from Mn crust (bloc H)								
SO249-DR96-1C	1. Rock Type: volcanic, highly altered clast recovered from Mn crust 2. Size: 5x4x3 cm from bloc H (17x17x11 cm) 3. Shape / Angularity: subrounded 4. Color of cut surface: red-orange oxidized 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (1%, 1mm) 7. Matrix: fine grained Plg 9. Encrustations: Mn crust 4mm 10. Comment: sample removed form Mn crust (bloc H)								
SO249-DR96-2	1. Rock Type: volcanic, moderately altered 2. Size: 14x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Plg (1%, 1mm) 7. Matrix: fine grained, Plg + altered Ol 8. Secondary Minerals: iddingsite after Ol in the groundmass and Mn along fractures 9. Encrustations: Mn crust (≤5mm) 10. Comment: this rock is simlar to -1A and -1B	x	x				MSC_SK	TS by Airfreight, GC taken out	
SO249-DR96-3	1. Rock Type: volcanic, fresh 2. Size: 5x4x3 cm from bloc J (43x2013 cm) 3. Shape / Angularity: angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: aphyric 7. Matrix: fine grained, Plg & Px 10. Comment: this rock was removed from a bloc of mud (J)	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR96-4	1. Rock Type: metamorphic, phillite?, fresh 2. Size: 26x5x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 10. Comment: rock has unusual elongated shape like a stick. Strong lineation on cleavage planes indicate durctile deformation. Cuts perpendicular to shistosity and along lineations reveals folded Qtz veins. Angularity somewhat excludes dopstone origin	x (x_SAS)							
SO249-DR96-5	1. Rock Type: metamorphic 2. Size: 10x8x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: drak grey 10. Comment: Looks like protolith material of -4 but less deformed and without folded Qtz veins	x							
SO249-DR96-6	1. Rock Type: volcanic, moderately altered 2. Size: 9x8x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Px (7%, 1mm) 7. Matrix: fine grained 8. Secondary Minerals: yellow alteration along fractures 10. Comment: insitu origin unclear, could be a dropstone	x (x_SAS)							
SO249-DR96-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR97

Ocean floor between Krusenstern and N.N Fracture Zone. Depression S of "Gummi Bear" seamount. N edge of one of the NW-SE striking abyssal hills that are bended eastward into the trough

Dredge on bottom UTC 10/07/16 23:06hrs, lat 49°23.64'N, long 163°09.97'E, depth 5008 m

Dredge off bottom UTC 11/07/16 00:32hrs, lat 49°23.26'N, long 163°10.04'E, depth 4425 m

total volume: one rock, one Mn crust

Comments: only a single Plg-Px phyric lava fragment of unclear origin recovered

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR97-1	1. Rock Type: volcanic, slightly altered 2. Size: 17x8x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric 6. Phenocrysts: Fsp (<2mm, <5%), Px at one side of piece (<2mm, ~7%) 7. Matrix: dense 9. Encrustations: Mn crust few mmm 10. Comment: insitu origin unclear	x	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR97-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR98

Ocean crust inbetween Krusenstern Fracture Zone and N.N.Fracture Zone. Southern slope of E-W trending bordering deep basin from south.

Dredge on bottom UTC 11/07/16 05:43hrs, lat 49°19.34'N, long 163°14.68'E, depth 5616 m

Dredge off bottom UTC 11/07/16 06:58hrs, lat 49°19.75'N, long 163°14.69'E, depth 5190 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR98-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR99

Ocean crust inbetween Krusenstern Fracture Zone and N.N.Fracture Zone. Small ridge trending NW-SE and bordering from north a deep basin; southern slope, lower to middle parts.

Dredge on bottom UTC 11/07/16 11:53hrs, lat 49°37.67'N, long 163°01.92'E, depth 5909 m

Dredge off bottom UTC 11/07/16 14:59hrs, lat 49°38.00'N, long 163°02.24'E, depth 5530 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR99-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR100

N.N. Fracture Zone. Seamount on the SW side of the F.Z. West facing slope from bottom to near top whee slope flattens.

Dredge on bottom UTC 12/07/16 01:50hrs, lat 48°50.66'N, long 162°46.82'E, depth 5639 m

Dredge off bottom UTC 12/07/16 03:04hrs, lat 48°50.45'N, long 162°47.29'E, depth 5299 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR100-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR101

N.N. Fracture Zone. NE side below small ridge SW facing slope from bottom to top.

Dredge on bottom UTC 12/07/16 09:37hrs, lat 49°06.44'N, long 162°48.51'E, depth 5737 m

Dredge off bottom UTC 12/07/16 10:52hrs, lat 49°06.75'N, long 162°48.90'E, depth 5380 m

total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR101-ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Abbreviations for Minerals and Materials:

Fsp: feldspar
Plg: plagioclase
Ol: olivine
Px: pyroxene
CPx: clinopyroxene
OPx: orthopyroxene
Cc: clacite
Mn: manganese
Bt: biotite
Amph: amphibole
Hbl: hornblende
Qtz: Quartz
GM: groundmass
Mt: Magnetite
Sp: Spinel

Appendix 2 (Leg2 Station Details and Rock Description)

SO249-DR103

Komandorsky Block - Small NW-SE trending ridge striking parallel to the Aleutian Arc

Dredge on bottom UTC 18/07/16 10:53hrs, lat 54°36.88'N, long 165°52.24'E, depth 5126 m

Dredge off bottom UTC 18/07/16 12:25hrs, lat 54°37.31'N, long 165°52.29'E, depth 4704 m

total volume: 1/6 full, few medium sized boulders

Comments: Only sedimentary rocks (fine-(mainly) to coarse grained) subanglar sandstones to clay sandstones. One sediment block - sandy clay (unconsolidated)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR103-1	1. Rock Type: sedimentary, fine grained sandstone 2. Size: 11x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: blueish grey / dark grey 5. Texture / Vesicularity: dense/massive 7. Matrix: equigranular grains of Fsp(?), greenish + black material 9. Encrustations: oxidized outer surface, no crust 10. Comment: -1 to -3 represent a group of different grained sandstones that all have similar coloration	x							
SO249-DR103-2	1. Rock Type: sedimentary, coarse grained sandstone 2. Size: 4x9x8 cm 3. Shape / Angularity:subangular, bit rounded 4. Color of cut surface: blueish grey, dark grey 5. Texture / Vesicularity: dense, massive 7. Matrix: evenly distributed grains of Qtz, Fsp, Ol (?), Amph(?), greenish matrix 9. Encrustations: one flat side has alteration zone ~0.5 cm of brownish-yellowish color 10. Comment: likely has contributions of volcanic material (phenocrysts of Ol (?), Amph (?))	x							
SO249-DR103 - 3	1. Rock Type: sedimentary, fine grained 2. Size: 10x13x20 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark blueish grey 5. Texture / Vesicularity: dense/massive, layered texture 7. Matrix: more fine grained than -1 9. Encrustations: no crust, with oxidized patchy surface	x							
SO249-DR103 - 4	1. Rock Type: sedimentary, consists of two parts: fine grained layered and folded (1) and medium-grained (2) 2. Size: 6x7x10 cm 3. Shape / Angularity: rounded, subangular 4. Color of cut surface: greenish - greyish 5. Texture / Vesicularity: dense, massive, some folding for the first part 7. Matrix: fine-grained needs microscopic investigation 8. Secondary Minerals: some brownish banded stripes 9. Encrustations: concentric zone of alteration ca. 0.5cm, rounded sides	x							

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR 103 - 5	1. Rock Type: sedimentary, clay-sandstone with small inclusion of fine-grained sandstone, altered 2. Size: 3x8x9 cm 3. Shape / Angularity:subangular 4. Color of cut surface: light greyish, pinkish, brownish 5. Texture / Vesicularity: dense, massive 7. Matrix: extrinaly fine-grained 9. Encrustations: no crust, oxidized in spots 10. Comment: thick concentric zone of alteration ca. 1.5 - 2 cm, thicker than the central part	x							
SO249-DR103 - 6	1. Rock Type: sedimentary 2. Size: 4x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish - greyish 5. Texture / Vesicularity: dense, massive, has two layers: (1) fine-grained, (2) medium-grained with larger clastes of ? (volcanoclasts ?) 7. Matrix: fine-grained 9. Encrustations: no crust, thin alteration zone 0.2 - 0.5 cm	x							
SO249-DR103 - 7	1. Rock Type: sedimentary, sedimentary-clay (mud stone) 2. Size: 25x30x45 cm, taken from larger block 3. Shape / Angularity: unconsolidated 4. Color of cut surface: greenish-yellowish								
SO249-DR103 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR104

Komandorsky Canyons - Ridge SW of Komandorsky Island. North facing slope at NW end of ridge along lower base to mid section

Dredge on bottom UTC 18/07/16 17:19hrs, lat 54°41.92'N, long 165°49.25'E, depth 5383 m

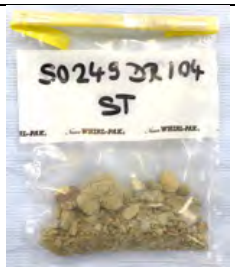
Dredge off bottom UTC 18/07/16 18:51hrs, lat 54°41.53'N, long 165°48.89'E, depth 5014 m

total volume: few rocks

Comments: One large and several small fragments of consolidated sediments

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR104 - 1A	1. Rock Type: Sediment (claystone) 2. Size: 10x8x8 cm, part of bloc C (60 x 30 x 12 cm) 3. Shape / Angularity: rounded 4. Color of cut surface: medum grey core, light brown rind 5. Texture / Vesicularity: sorted clay with ~1% rounded clasts 10. Comment: this sample is the matrix of block C. The greyish core is lythified and the rind is semi-consolidated	x							
SO249-DR104 - 1B	1. Rock Type: sedimentary, sandstone 2. Size: 6x5x2 cm 3. Shape / Angularity: rounded 4. Color of cut surface: medium grey 5. Texture / Vesicularity: well sorted medium grained sand with a layer of fine grained sand on one side of the rock 10. Comment: this sample is a clast found in bloc C	x							
SO249-DR104 - 1C	1. Rock Type: sediment 2. Size: 6x3x3 cm 3. Shape / Angularity: sub-angular 4. Color of cut surface: medium grey 5. Texture / Vesicularity: mud with 5-10% medium - fine sand - sized grains. Uneven / wavy laminations ca. 1mm, larger grains are subrounded - mostly white, few grey to black 10. Comment: clast found in block C	x							
SO249-DR104 - 1D	1. Rock Type: sediment ? ...volcaniclastic? 2. Size: 3x3x2 cm 3. Shape / Angularity: subangular - subrounded 4. Color of cut surface: medium to dark grey 5. Texture / Vesicularity: moderately sorted fine to medium sand-sized grains, massive, most grains are subrounded + medium grey, some are black, some are lighter blueish grey 10. Comment: clast found in block C	x							
SO249-DR104 - 2	1. Rock Type: sedimentary (clay / mudstone) 2. Size: 21x14x4 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light greenish -grey 5. Texture / Vesicularity: mudstone,massive, 5-7% fine to medium sand-sized grains. Sandgrains are half white, half dark grey or black and angular to subrounded.	x							

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR104 - 3	1. Rock Type: sedimentary, claystone 2. Size: 16x8x6cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey-brown 5. Texture / Vesicularity: clay, possible uneven laminations, 1-3mm. Part of sample has numerous, approx. sub-parallel fractures (partly filled) < 1mm wide 9. Encrustations: thin Mn + yellowish (limonite?) coating	x							
SO249-DR104 - 4	1. Rock Type: sedimentary 2. Size: 13x13x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: medium grey to greenish grey, light off-white, dark grey 5. Texture / Vesicularity: fragmented layers of sandy mud + muddy sand. Sand is mostly fine to medium grained, subrounded, dark grey to black grains, < 3% white grains. < 1mm veins of dark grey granular material. Also some 1-4 mm veins of calcite	x							
SO249-DR104 - 5	1. Rock Type: sedimentary 2. Size: 13x10x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark to light brownish grey 5. Texture / Vesicularity: mud and very fine sand (ca. 50:50). Texturally massive but has wavy bands / laminations (1-7mm) of darker brownish material. Some very fine fractures with Fe-oxide filling. 9. Encrustations: thin Fe-Mn coating	x							
SO249-DR104 - 6	1. Rock Type: sedimentary 2. Size: 10x5x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium, greenish-grey 5. Texture / Vesicularity: sandy mud - same as sample -5, but without wavy bands. Has very fine fractures with Mn dendrites growing from them. 9. Encrustations: thin Mn coating								
SO249-DR104 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR106

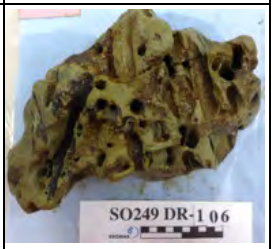
Beringia Margin. Lower slope of south-western canyon.

Dredge on bottom UTC 21/07/16 4:28hrs, lat 60°19.99'N, long 179°33.91'E, depth 2496 m

Dredge off bottom UTC 21/07/16 05:39hrs, lat 60°19.68'N, long 179°34.09'E, depth 2109 m

total volume: full

Comments: Semiconsolidated sediments of two types: 1- yellowish grey mudstone with numerous worm trails; 2- greyish-blue claystone. Abundant biology.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR106-1X	1. Rock Type: semiconsolidated sediment; mudstone 2. Size: 26x23x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: beige/ yellowish grey 5. Texture: numerous worm trails								
SO249-DR106-2X	1. Rock Type: semiconsolidated sediment; claystone 2. Size: 28x19x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: bluish-grey								
SO249-DR106 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR107

Beringia Margin SE corner of work area. ~10nm further NW of DR106. S facing wall at northern end of valley. Lower slope of southwestern

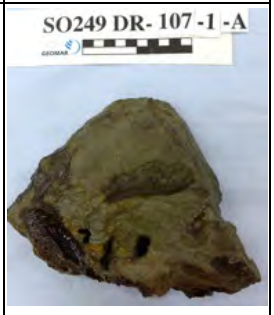
Dredge on bottom UTC 21/07/16 09:56hrs, lat 60°28.98'N, long 179°25.61'E, depth 2316 m

Dredge off bottom UTC 21/07/16 11:06hrs, lat 60°29.31'N, long 179°25.74'E, depth 2003 m

total volume: 1/5 full + biology

Comments: A lot of various biology predominates. Also there are some semi-consolidated clay sediments with abundant worm tubes and holes

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR107-1A	1. Rock Type: sediment, semi-consolidated clay 2. Size: 10x17x17 cm 3. Shape / Angularity: angular 4. Color of wet surface: blueish-greenish-grey 5. Texture / Vesicularity: massive but easily broken, with abundant worm holes / burrows / trails 7. Matrix: fine grained, clayish								
SO249-DR107-1B	1. Rock Type: the same sample as demonstration sample as it has nice abundant worm or bivalve holes and trails up to 1.5-2cm 2. Size: 6x12x17 cm 3. Shape / Angularity: angular								
SO249-DR107 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR108

Beringia Margin: upper end of valley W of DR107. ENE sriking valley; track along SSE dipping slope from bottom to top

Dredge on bottom UTC 21/07/16 16:19hrs, lat 60°35.87'N, long 179°04.90'E, depth 2197 m

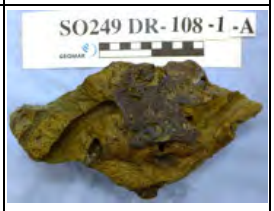
Dredge off bottom UTC 21/07/16 17:28hrs, lat 60°36.20'N, long 179°04.83'E, depth 1729 m

total volume: 1/4 full

Comments:

soft sediment + biology. Three dropstones and lots of semi-consolidated mud with worm tubes.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR108-1A	1. Rock Type: sediment, semi-consolidated claystone, similar to DR106 and DR107 2. Size: 9x10x20 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive, fine grained 8. Secondary Minerals: 9. Encrustations: brownish, biological origin (?) as on the walls of worm trails 10. Comment: contains worm tracks								
SO249-DR108-1B	1. Rock Type: similar to 1A, claystone 2. Size: 7x9x10 cm 3. Shape / Angularity: angular 10. Comment: without crusts								
SO249-DR108 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR109

Chukotka-Beringia Margin at SW end of work area. Young fault (tilted bloc?) off SW end of Chukotka margin. SW facing scarp from bottom to top.

Dredge on bottom UTC 23/07/16 04:55hrs, lat 60°08.85'N, long 171°28.84'E, depth 2720 m
Dredge off bottom UTC 23/07/16 06:29hrs, lat 60°09.16'N, long 171°29.19'E, depth 2099 m
total volume: few rocks
Comments:
predominantly well solidified silty clay. One large fragment of conglomerate. Abundant biology (sponges, crab etc)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR109-1	1. Rock Type: sediment, silty clay 2. Size: 13x13x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 10. Comment: fragments of this litology predominate the dredge								
SO249-DR109-2	1. Rock Type: sediment, conglomerate 2. Size: 25x15x14 cm 3. Shape / Angularity: angular, undefined 5. Texture / Vesicularity: composed of diverse pebbles, very well rounded from ø10cm to mm-sized 7. Matrix: carbonate with admixture of clay (?), perhaps with siliceous component 8. Types of pebbles: A) chert, B) sandstone, argillite, C) Px phyric basalt (?), vesicular, making up 30% of the pebbles, D) Plg phyric basalts, E) tuff, F) some well preserved shell fragments 10. Comment: 1/4 of sample goes to D. Saveliev for paleontological investigation (age determination). The rock is likely a beach deposit, cemented in marine environment								
SO249-DR109 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR110

Chukotka Margin. Fault system SE of Olyutorskiy peninsula, SW facing slope at a fault scarp

Dredge on bottom UTC 24/07/16 02:44hrs, lat 60°03.11'N, long 171°17.77'E, depth 2411 m

Dredge off bottom UTC 24/07/16 03:53hrs, lat 60°03.05'N, long 171°18.50'E, depth 1941 m

total volume: 1/2 full

Comments:

solidified sediments, biology

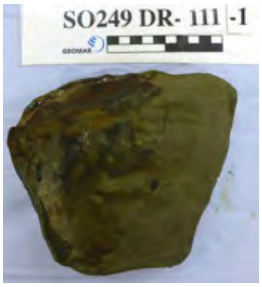
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR110-1	1. Rock Type: sediment, sandy clay 2. Size: 23x11x19 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive fine grained 10. Comment: sandy clay with slippery surface								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR110 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR111

Chukotka Margin. SW-NE trending canyon S of Olyutorskiy Peninsula, N facing slope

Dredge on bottom UTC 24/07/16 09:19hrs, lat 59°40.67'N, long 170°43.56'E, depth 2721 m
Dredge off bottom UTC 24/07/16 11:13hrs, lat 59°40.23'N, long 170°43.66'E, depth 1194 m
total volume: 1/2 full
Comments: abundant semi-solidified sediments with worm / bivalve burrows. One large sub m-sized bloc of the sediment with borrows. Lots of biology (worms, sponges, crabs)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR111-1	1. Rock Type: sediment, sandy clay 2. Size: 18x16x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish brown 5. Texture / Vesicularity: massive without worm burrows 7. Matrix: fine grained mix of sandy particles and clay 9. Encrustations: very thin Mn coating 10. Comment: representative sediment from Eastern slope of Shirsov Ridge at its northern termination								
SO249-DR111 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR112

Shirshov Ridge Western Margin. Oval shaped ridge along NE facing slope. Westward track across fault. Site is on the opposite side of the mountain where SO201-103 obtained ultramafic rocks.

Dredge on bottom UTC 24/07/16 16:49hrs, lat 58°47.12'N, long 170°00.21'E, depth 1909 m
Dredge off bottom UTC 24/07/16 18:06hrs, lat 58°47.07'N, long 169°59.38'E, depth 1447 m
total volume: 1/2 full
Comments:

The dredge yielded predominantly ultramafic rocks - harzburgites, pyroxenites and dunites with highly variable proportions of Ol and Opx. Samples -1 to -8 harzburgites, -9 orthopyroxenite, -10 to -11 dunites. The rocks are stongly to moderately altered. OPx and Sp are fresh in some samples. All have very thin Fe-Mn hydroxide films on their surfaces, indicating limited exposure times to seawater. Many outer surfaces expose slicknsides fabrics reflecting intense brittle deformation, presumably imprinted during uplift of these mantle rocks. Taken togehther these observations indicate relatively young tectonic movements of the rock complex. Other rocks of the dredge represent diverse metamorphic rocks from -presumably- a tectonic mélange bordering the ultramafic bloc from north. Sample -12 an ortho-amphibolite after basalt, -13 and -14 ortho-amphibolite after dolerite and microgabbro, -15 & -16 ortho-amphibolite after leucocratic gabbro, -17 through -20 metasedimentary rocks. All together the rocks represent a full section of oceanic lithosphere, metamorphosed under amhibolite facies conditions. This part of Shirshov ridge can also be interpreted as metamorphic sole comprising large cores of ultramafic as well as sedimentary (see DR114) rocks.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR112-1	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: part of bloc F, 20x17x16 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey with light spots 5. Texture / Vesicularity: massive 6. Phenocrysts: altered Ol, OPx, minor Sp; Ol:OPx = 50:50, crystall size 2-3mm 8. Secondary Minerals: serpentine and Fe hydroxides after Ol, bastite after OPx 9. Encrustations: thin Fe-Mn hydroxide film on surface. Thin veining filled with black Fe-Mn oxides	x (x_SAS)	x						
SO249-DR112-2	1. Rock Type: matamorphic, harzburgite, strongly altered; similar to -1 2. Size: part of bloc E, 27x18x22 cm 3. Shape / Angularity: reddish grey 10. Comment: this sample has more OPx than Ol (60:40). More abundant veining and overall more altered than -1	x (x_SAS)	x						
SO249-DR112-3	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: 13x11x11 cm 4. Color of cut surface: reddish grey 10. Comment: very similar to -1	x (x_SAS)	x						
SO249-DR112-4	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: 20x17x11 cm 4. Color of cut surface: reddish grey with light spots 10. Comment: very similar to -1; Ol > OPX; 70:30, strongly altered	x (x_SAS)	x						
SO249-DR112-5	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: 19x20x7 cm 4. Color of cut surface: yellowish grey with white spots 10. Comment: very similar to -1 but has OPx > Ol; 60:40, abundant veining, Sp crystals are small (<0.5mm) and rare (<1%)	x (x_SAS)	x						
SO249-DR112-6	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: fragment of bloc H; 38x25x22 cm 4. Color of cut surface: dark reddish grey with light grey spots 10. Comment: similar to -1, Ol:OPx = 50:50, abundant veining of Fe-Mn oxides (?), slip planes with slickenslides on the outer surface	x (x_SAS)	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR112-7	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: 12x11x9 cm 4. Color of cut surface: reddish grey with light spots 10. Comment: similar to -1 and particular to -6	x (x_SAS)	x						
SO249-DR112-8	1. Rock Type: metamorphic, harzburgite, strongly altered 2. Size: 15x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey with orange stripes 5. Texture / Vesicularity: massive 6. Phenocrysts: OPx (60%, ≤4-5mm), Ol altered to Fe hydroxide (40%) 8. Secondary Minerals: see -1 9. Encrustations: see -1 10. Comment: somewhat foliated, contains large OPx which may be fresh in places, slicknside surface on outside	x (x_SAS)	x						
SO249-DR112-9	1. Rock Type: metamorphic, orthopyroxenite with Ol, altered 2. Size: 14x9x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish grey with redstripes 5. Texture / Vesicularity: massive, slightly foliated 6. Phenocrysts: OPx (≤1cm, ~90%), Ol (0.5cm, <10%) 8. Secondary Minerals: OPx black , replaced by bastite; Ol replaced by Serpentine and Fe hydroxides 9. Encrustations: thin Mn film on outer surface, slik and slide surfaces 10. Comment: OPx may be fresh in some parts	x (x_SAS)	x						
SO249-DR112-10	1. Rock Type: metamorphic (?), meta-dunite, strongly altered 2. Size: 17x13x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark brown with yellow spots 5. Texture / Vesicularity: massive 6. Phenocrysts: Ol ~100% replaced by Serpentine and Fe hydroxides, small Sp <1mm, y1% 8. Secondary Minerals: Fe-hydroxide after Ol 9. Encrustations: thin black film of Fe-mn hydroxide on surface, abundant veining. Thick vein (~5-10mm) cutting the sample - chalcedone? 10. Comment: typical dunite texture, abundant veining. Relatively large amount of Sp. Veins may be filled with amorphous Qtz (!)	x (x_SAS)	x						
SO249-DR112-11	1. Rock Type: metamorphic (?), meta-dunite, strongly altered, similar to -10 2. Size: 14x10x cm 3. Shape / Angularity: 4. Color of cut surface: reddish / orange grey to dark brown in the most altered places 10. Comment: Overall more altered in outer parts where Fe-hydroxides are replaced with more dense dark brown stuff. Some white filling in veins (not Cc)	x (x_SAS)	x						

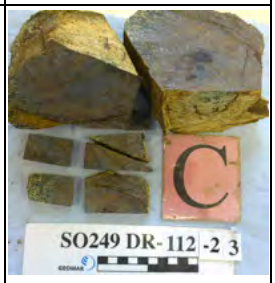
Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR112-12	1. Rock Type: metamorphic, ortho-amphibolite, fresh 2. Size: 13x9x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: black 5. Texture / Vesicularity: massive, fine grained, slightly foliated, partly granoblastic 6. Phenocrysts: Amph (~60%, <1mm) black elongated crystals, Plg (~40%), Fe-oxides (?), native Cu? 8. Secondary Minerals: minor oxidation 9. Encrustations: thin Mn film on outer surface, thin veins of Qtz (?) 10. Comment: amphibolite after basalt (?). Ar-Ar age dating on Amph and Plg	x (x_SAS)	x	ok, Amph + Plg					
SO249-DR112-13	1. Rock Type: metamorphic, meta-dolerite, moderately altered 2. Size: 18x12x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, fine grained, foliated 6. Phenocrysts: Plg (60%, 1mm); Amph (~30%, 1mm); Px (?, ~10%, ≤1mm 8. Secondary Minerals: Fe oxides, chloritization 9. Encrustations: thin outer film of Fe-Mn hydroxides, thin veins of amorphous Qtz 10. Comment: meta-dolerite, perhaps amphibolite, more leucocratic than -12 and altered. Amph + Plg may be used for Ar-Ar	x (x_SAS)	x	ok, Amph + Plg					
SO249-DR112-14	1. Rock Type: metamorphic, meta-gabbro, moderately altered 2. Size: 14x9x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive, foliated, medium grained 6. Phenocrysts: Plg:Amph = 50:50, granoblasts of OPx(?) ≤2mm, 5% 8. Secondary Minerals: Chl, Fe-Mn hydroxides 9. Encrustations: thin outer film of Fe-Mn hydroxides, amorphous Qtz veins (?) 10. Comment: amphilbolite after OPx bearing gabbro (?). Somewhat altered but Amph and Plg maybe good for Ar-Ar. Also may contain primary zircon	x (x_SAS)	x	ok, Amph + Plg					
SO249-DR112-15	1. Rock Type: metamorphic, leucocratic meta-gabbro, amphibolite 2. Size: 15x14x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: light greenish grey 5. Texture / Vesicularity: foliated, massive, medium grained, granoblastic 6. Phenocrysts: Plg (Ab?, ~80% = matrix), Amph / Act (~10-15%, ≤2mm), granoblasts of OPx (≤2-3mm, isometric) 8. Secondary Minerals: albitization?, Qtz veins 9. Encrustations: thin film of Fe-Mn oxides 10. Comment: Amphilbolite after leucocratic gabbro (?). Plg for Ar-Ar, may contain Zircon for U-Pb dating	x (x_SAS)	x	ok, Plg					

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR112-16	1. Rock Type: metamorphic, leucocratic meta-gabbro, amphibolite 2. Size: 17x15x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey, banded 10. Comment: similar to -15, somewhat more mafic, (Plg/Amph 60:40), more Opx ~5-7%	x (x_SAS)	x	ok, Plg					
SO249-DR112-17	1. Rock Type: metamorphic, meta-sediments 2. Size: 20x12x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: foliated, partly granoblastic 7. Matrix: Qtz, Sten, Act, cryptocrystalline 8. Secondary Minerals: Qtz in veins 9. Encrustations: abundant veins filled by amorphous Qtz 10. Comment: metamorphic rock of unclear origin, probably sediment or metadiorite / granite	x (x_SAS)	x						
SO249-DR112-18	1. Rock Type: metamorphic, meta-sediment (?) 2. Size: 17x15x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: black with red veins 5. Texture / Vesicularity: cryptocrystalline, massive, some granoblasts 8. Secondary Minerals: Fe-oxides 9. Encrustations: abundant veining filled with Fe-hydroxides 10. Comment: metamorphic rock of unclear protolith. It may be metasediment or very altered peridotite	x (x_SAS)	x						
SO249-DR112-19	1. Rock Type: metamorphic, meta-sediment (?), simlar to -18 2. Size: 13x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with of orange veins 10. Comment: metamorphic rock of unclear protolith, similar to -18	x (x_SAS)							
SO249-DR112-20	1. Rock Type: metamorphic, meta-sediment (?) 2. Size: 16x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: yellowish grey 5. Texture / Vesicularity: foliated, fine grained 8. Secondary Minerals: strong oxidation, yellow color 9. Encrustations: Fe-Mn film on surface (≤1mm) 10. Comment: metamorphic rock of unclear protolith, it may be true meta-sediment	x (x_SAS)							
SO249-DR112-21	1. Rock Type: metamorphic, harzburgite with vein of amorphous Qtz (?) 2. Size: 17x11x9 cm 10. Comment: simlar to -1, contains thick vein of amorphous matrial which can be Qtz. Slicknsides on surface with thin Fe-Mn film	x (x_SAS)							

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR112-22	1. Rock Type: metamorphic, harzburgite, srongly altered 2. Size: 19x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark brown with light greenish gray spots 5. Texture / Vesicularity: foliated, granoblastic 6. Phenocrysts: large granoblasts of OPx (~1cm, 5-10%), matrix = serpentine after Ol 8. Secondary Minerals: serpentine after Ol, bastite after OPx 9. Encrustations: abundant veins filled with black stuff, slicknsides on outer surface 10. Comment: strongly altered harzburgite with large granoblasts of OPx	x (x_SAS)							
SO249-DR112-23	1. Rock Type: metamorphic, harzburgite, strongly to moderately altered, similar to -1 2. Size: 10. Comment: similar to -1	x (x_SAS)							
SO249-DR112-24	1. Rock Type: metamorphic, harzburgite 2. Size: 13x13x7 cm 3. Shape / Angularity: subrounded 10. Comment: strongly altered similar to -1 in least altered parts. It has several narrow zones of alteration which can be studied in one thin section	x (x_SAS)							
SO249-DR112-25X	1. Rock Type: metamorphic, meta-leucocratic gabbro 10. Comment: analog to samples -15 & -16								
SO249-DR112 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Appendix 2 (Leg2 Station Details and Rock Description)

SO249-DR113

Shirshov Ridge (western slope). Third "core-complex" from north, base SE facing slope

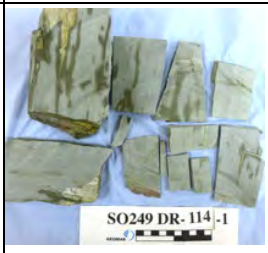
Dredge on bottom UTC 25/07/16 01:21hrs, lat 58°21.65'N, long 169°43.02'E, depth 2721 m
Dredge off bottom UTC 25/07/16 02:51hrs, lat 58°22.01'N, long 169°43.71'E, depth 2291 m
total volume: 1/4 full
Comments: semi-consolidated sediments

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR113-1	1. Rock Type: sedimentary, mudstone 2. Size: 14x12x6 cm 4. Color of cut surface: yellow 5. Texture / Vesicularity: with worm holes								
SO249-DR113 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

SO249-DR114

Shirshov Ridge, western slope. Southernmost "core complex" along its northern slope

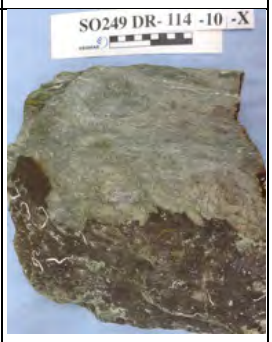
Dredge on bottom UTC 25/07/16 06:31hrs, lat 58°15.38'N, long 169°39.12'E, depth 2739 m
Dredge off bottom UTC 25/07/16 08:13hrs, lat 58°14.95'N, long 169°38.72'E, depth 2262 m
total volume: full
Comments: All rocks are relatively uniform para-shists. Single pebble of granodorite and single angular meta-andesite

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR114-1	1. Rock Type: metamorphic, greenshist, para-shist 2. Size: 20x16x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: foliated, thin stripes up to 1mm white color, silicic material (Qtz?) in greenish matrix 7. Matrix: massive, fine grained, micro layers of silicic veins, porphyroblasts of garnet(?, up to 1.5mm) brown grains 8. Secondary Minerals: Gt could be pyrite replaced by Fe-oxides? 10. Comment: determination of metamorphic grade, para-sedimentary rock, Gt is questionable = reddish mineral probably octahedral in shape, opaque?	x (x_SAS)	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR114-2	1. Rock Type: metamorphic, greenshist, parashist 2. Size: 17x16x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: shist like, layered but light layers ghosted 6. Phenocrysts: porpyroblasts of Gt or Fe-oxide after Pyrite 7. Matrix: fine grained with Chl 8. Secondary Minerals: Qtz in veins up to 2mm thick 10. Comment: more pseudo Gt than in -1	x (x_SAS)	x						
SO249-DR114-3	1. Rock Type: metamorphic, similar to -1 2. Size: 11x10x10 cm 6. Phenocrysts: some clasts 10. Comment: more pseudo Gt than in -2	x (x_SAS)	x						
SO249-DR114-4	1. Rock Type: looks like -1 but with lense like layered texture 2. Size: 17x10x6 cm 8. Secondary Minerals: in Qtz veins there are some Fe-hydroxides, pseudo Gt after pyrite	x (x_SAS)	x						
SO249-DR114-5	1. Rock Type: metamorphic, para-shist 2. Size: 11x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive 6. Phenocrysts: have single Gt grains (ocasional) or pyrite 7. Matrix: fine graned 8. Secondary Minerals: Qtz veins up to 2-3 mm 10. Comment: good for geochemistry; Gt is questionable	x (x_SAS)	x						
SO249-DR114-6	1. Rock Type: looks similar to -1 2. Size: 17x8x7 cm 8. Secondary Minerals: Qtz veins with micro layers of green color (Epidote?) 10. Comment: more Gt? in matrix (pyrite?)								
SO249-DR114-7	1. Rock Type: metamorphic 2. Size: 10x6x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey, darker and lighter layers 5. Texture / Vesicularity: foliated, microporphyroblastic 7. Matrix: fine grained 8. Secondary Minerals: Chl, Act-Trem (?)	x (x_SAS)	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR114-8	1. Rock Type: metamorphic, parashist 2. Size: 24x10x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: foliated, thin to 1mm white, light greenish lines of silicic material 6. Phenocrysts: microgranoblastic 7. Matrix: fine grained 8. Secondary Minerals: rare crystals up to 2mm of altered pyrite(?) 9. Encrustations: sample is cut by Qtz veins, sometimes greenish brownish	x (x_SAS)	x						
SO249-DR114-9	1. Rock Type: metamorphic, parashist 2. Size: 9x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light yellowish-greyish-brownish 5. Texture / Vesicularity: layered / foliated 9. Encrustations: almost totally silicified and partly oxidized	x (x_SAS)	x						
SO249-DR114-10X	1. Rock Type: metamorphic, represantative for dredge, large piece for demonstration purposes 2. Size: 30x30x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: light greenish grey 5. Texture / Vesicularity: foliated 7. Matrix: fine grained 8. Secondary Minerals: Qtz veins up to 1cm 9. Encrustations: partly covered with thin Fe-Mn film 10. Comment: reference to -1								
SO249-DR114-11	1. Rock Type: meta-volcanic, andesite? 2. Size: 25x10x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey with brownish shadow 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Plg (7%, 0.5 - 3mm), Amph (3%, 0.5 - 3mm), both replaced by secondary minerals 7. Matrix: amorphous 8. Secondary Minerals: Plg replaced by serecite and talc. Amph, Chl, Hem 10. Comment: no encrustations	x (x_SAS)	x						
SO249-DR114 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

Appendix 2 (Leg2 Station Details and Rock Description)

SO249-DR115

Shirshov Ridge, central western flank. N-S trending ridge at ~N termination. Eastern flank along E-W striking valley along N facing slope thereof

Dredge on bottom UTC 25/07/16 16:03hrs, lat 57°41.36'N, long 169°08.92'E, depth 2921 m
Dredge off bottom UTC 25/07/16 17:21hrs, lat 57°40.95'N, long 169°08.91'E, depth 2557 m
total volume: 1/5 full with mud
Comments: lots of mud and three possible dropstones. Two are dacitic tuffs. So it may well be that they are insitu.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR115-1	1. Rock Type: volcaniclastic 2. Size: 7x5x2 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: clastic, massive 6. Phenocrysts: Qtz?, Plg, OPx 7. Matrix: massive texture with small (2-5mm) elongated volcanic clasts. Clasts of sedimenary rock (up to 3-4mm) 10. Comment: dacitic tuff?								
SO249-DR115-2	1. Rock Type: volcaniclastic 2. Size: 9x5x2 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: clastic texture, massive 6. Phenocrysts: Plg (~15%), Qtz, OPx (~5-7%) 7. Matrix: fine grained clastic matrix 10. Comment: dacitic tuff								
SO249-DR115 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

SO249-CTD116

Beta working area, eastern boundary above Gamma FZ basement high

CTD max depth UTC 26/07/16 03:10hrs, lat 57° 54,435' N, long 165° 57,615' E, depth 3570 m, max rope length 2000 m
CTD on deck UTC 26/07/16 03:51hrs, lat 57° 54.43' N, long 165° 57.61' E, depth 3571 m
total volume: does not apply

SO249-DR117

Beta Fracture Zone. Westernmost basement high, ~10km long, NW-SE elongated ridge, small canyon at its N end

Dredge on bottom UTC 26/07/16 10:18hrs, lat 57°32.58'N, long 169°21.45'E, depth 2984 m
Dredge off bottom UTC 25/07/16 17:21hrs, lat 57°40.95'N, long 169°08.91'E, depth 2557 m
total volume: 1/6 full
Comments: mostly mud with lots of biology (very large worms), two rounded dropstones, one subangular block of sediment rock

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR117-1	1. Rock Type: sedimentary, original block, unsmashed, uncut to preserve sedimentological infomation 2. Size: 23x20x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-greenish to dark grey 5. Texture / Vesicularity: massive and layered 7. Matrix: block consists of two equal sized parts. a) massive medium grained, light grey, likely a sandstone and b) layered, fine grained, from light grey to dark grey, thin layers (0.5-2mm) of of chert like silicified layers of silt, 9. Encrustations: 1/3 of sample surface is covered with a thin brownish film of Mn-FeOH								
SO249-DR117-2	1. Rock Type: semi-consolidated clay stone 2. Size: 20x10x5 cm, half part of a bloc 3. Shape / Angularity: rectangular but soft 4. Color of cut surface: grey greenish 5. Texture / Vesicularity: massive 7. Matrix: fine grained, soft clayish 10. Comment: small brown pebbles could be included								
SO249-DR117 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

SO249-DR118
Beta Rise, Beta Fracture Zone. NE slope of small NW-SE striking ridge.
Dredge on bottom UTC 27/07/16 22:37hrs, lat 56°40.46'N, long 166°06.36'E, depth 3591 m
Dredge off bottom UTC 27/07/16 23:55hrs, lat 56°39.99'N, long 166°06.06'E, depth 3273 m
total volume: few rocks
Comments: Blocks of sediment. One large block of granite, mudstones.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR118-1	1. Rock Type: semi-consolidated sediment 2. Size: 11x11x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: light brownish green 5. Texture / Vesicularity: mudstone 9. Encrustations: thin Mn coating								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR118-2-Mn	1. Rock Type: Mn nodule 2. Size: 10x8x6 cm								
SO249-DR118-3-Mn	1. Rock Type: Mn nodule 2. Size: 12x7x4 cm								
SO249-DR118 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

SO249-DR119

Beta Rise, Beta Fracture Zone. Isolated seamount ~40km from southeasternmost Smt of the Beta FZ working area

Dredge on bottom UTC 27/07/16 06:46hrs, lat 57°02.47'N, long 165°40.94'E, depth 3457 m

Dredge off bottom UTC 27/07/16 08:09hrs, lat 57°2.75'N, long 165°40.23'E, depth 3189 m

total volume: 1/4 full

Comments: Mostly semi-consolidated sediments, numerous pebbles and fragments of metamorphic rock and sedimentary rocks. Two angular pieces of Ol-Plg basalts interpreted to be insitu rocks with MORB affinity. One angular Plg-Cpx phyric basalt / andesite; possibly a dropstone.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR119-1	1. Rock Type: volcanic, mostly fresh, rare Plg-Ol basalt 2. Size: 13x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: medium dark grey 5. Texture / Vesicularity: massive, partly vesicular 6. Phenocrysts: Plg (~1%, up to 3mm, fresh), Ol (<1%, 1mm, fresh) 7. Matrix: fine grained 8. Secondary Minerals: 2mm alteration halo along outer margin, some oxidation near porous area 10. Comment: one out of two pieces of basalt with similar appearance and interpreted to be of insitu origin, good for geochemistry and Ar-Ar age dating	x	x	1 (Plg)	Ol, Plg			TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR119-2	1. Rock Type: volcanic, mostly fresh, rare Plg-Ol basalt, generally identical to -1; differences see 10) 2. Size: 10. Comment: small cracks filled ith Fe-Mn oxides, good for geochemistry and age dating							TS in Airfreightbox	
SO249-DR119-3	1. Rock Type: volcanic, Plg phyric andesite(?), mostly fresh 2. Size: 8x7x4 cm 3. Shape / Angularity: sub-angular 4. Color of cut surface: dark to brownish grey with light spots 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Plg (20%, up to 3mm), Px (5-7%, ~1mm), Ol (altered, 1-2%, ~0.5mm) 7. Matrix: fine grained 8. Secondary Minerals: minor chloritization of of Plg, minor oxidation 9. Encrustations: thin Mn crust 10. Comment: good for geochemistry and Ar-Ar dating but most likely a dropstone	x	x	2	Px, Plg, Ol?				
SO249-DR119-4	1. Rock Type: semi-consolidated sediment with pebbles and worm holes 2. Size:								
SO249-DR119 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	no picture taken

SO249-DR120

Alpha fracture zone: Northwestern termination of Allpha F.Z. near western boundary of working area. NNE dipping slope from bottom to top.

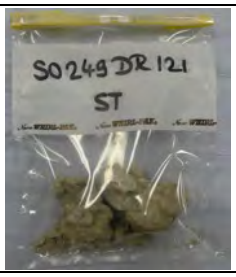
Dredge on bottom UTC 27/07/16 17:45hrs, lat 57°11.59'N, long 164°04.27'E, depth 2713 m
Dredge off bottom UTC 27/07/16 19:42hrs, lat 57°11.09'N, long 164°04.07'E, depth 2367 m
total volume: 2/3 full
Comments: Mud; dropstones; some sediment blocks and Mn nodules.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR120-1-Mn	1. Rock Type: Mn nodule with some semi-consolidated sediments 2. Size: 16x10x8 cm 3. Shape / Angularity: Angular 4. Color of cut surface: sediments brownish grey 5. Texture / Vesicularity: sediments, mud. Contains up to 10% rounded gravel (0.5-1 cm). Gravel fragments are mostly black/dark grey, some greenish grey or dark brown 9. Encrustations: assorted invertebrates (sponge, coral...)								
SO249-DR120-2	1. Rock Type: semi-consolidated sediments 2. Size: 23x14x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish-brownish grey 5. Texture / Vesicularity: massive mudstone. Contains less than 5% of rounded gravel (same as in sediment portion of sample 1)								
SO249-DR120 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR121

Alpha fracture zone: Small step in ocean floor ca. 8 nm south of the westernmost section of Alpha F.Z.

Dredge on bottom UTC 27/07/16 00:18hrs, lat 57°4.22'N, long 164°02.36'E, depth 3264 m
Dredge off bottom UTC 27/07/16 01:27hrs, lat 57°4.62'N, long 164°02.50'E, depth 3000 m
total volume: empty
Comments: mud

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR121 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR122

Beta Rise, Alpha F.Z.: westernmost part of Alpha F.Z., SW facing slope of the fracture zone.

Dredge on bottom UTC 28/07/16 05:04hrs, lat 57°4.85'N, long 164°19.24'E, depth 2750 m
Dredge off bottom UTC 28/07/16 06:10hrs, lat 57°05.24'N, long 164°19.45'E, depth 2440 m
total volume: 1/4 full
Comments: semi-consolidated sediments with abundant wood fragments.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR122-1	1. Rock Type: sandstone 2. Size: 32x30x8 cm 3. Shape / Angularity: subangular to rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: greenish alteration rim, cracks filled with fine sand and silt					x			
SO249-DR122-2	1. Rock Type: sedimentary, clay 2. Size: 4. Color of cut surface: greenish-brown to black 5. Texture / Vesicularity: worm holes 10. Comment: contains fragments of small stones					x			
SO249-DR122-3	1. Rock Type: sediment: clay 2. Size: 4. Color of cut surface: dark grey 10. Comment: contains peices of wood and biologicals; wormholes; brownish alteration on outer surface					x			
SO249-DR122-4	1. Rock Type: sediment: wood 10. Comment: seven pieces of wood alterd, dark brown, red alteration parts on surface. One sample went to D.Savelyev					x			
SO249-DR122 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR123

Alpha F.Z.: soth-west facing slope from bottom to top

Dredge on bottom UTC 28/07/16 15:34hrs, lat 56°2.10'N, long 166°34.44'E, depth 3798 m
Dredge off bottom UTC 28/07/16 18:26hrs, lat 56°2.63'N, long 166°34.62'E, depth 3287 m
total volume: few rocks
Comments: small dropstones, one sample of possible in-situ origin - tuff or aphyric basalt

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR123-1	1. Rock Type: sediment or volcanic ? 2. Size: 6x4x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: no vesicules 10. Comment: this rock has unclear provevnce, thin section should be inspected before doing geochemistry, if this rock is volcanic, it is good for chemistry and possibly Ar/Ar dating	x	x						
SO249-DR123 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR124

Volcanologists Massif: Tilted block (?) north-west of the western flank of the massif, northeastern flank of the seamount

Dredge on bottom UTC 29/07/16 00:26hrs, lat 55°41.83'N, long 167°07.59'E, depth 3879 m
Dredge off bottom UTC 29/07/16 01:39hrs, lat 57°41.33'N, long 167°07.00'E, depth 3460 m
total volume: 1/4 full
Comments:

Pillow lava fragments; few dropstones.
This dredge yilded mostly MORB-like pillow-lava fragments of Ol-Pl phyric basalts with variable amount of phenocrysts. Two generations of phenocrysts are present:c1st - large (Plg up to 1 cm, Ol up to 0.5 cm) phenocrysts, sometimes in intergrowth, compose ca. 5% of the rock; 2nd - smaller (Plg <0.5cm, Ol <1mm) and more abundant phenocrysts (10-15% of rock).
Samples -1 and -2 are relatively well crystallized with matrix of intersertal matrix, medium grained. Samples -3 to -14 are fine crystallized, glassy pillow-lava fragments. All contain fresh volcanic glass. Sample -15 is a breccia consisting of a large fragment of Ol-CPx basalt and numerous smaller fragments of rare-Cpx-Plg phyric vesicular basalt and glasses in tuffeceous fine-grained matrix. Samples -16 to -18 are Ol-Pl phyric basalts of the predominant type but more altered. Sample -19X is a silty mudstone that coulc be part of a turbidite. Sample -20X and -21X are Mn-crusts. Sample -20X is unusual because of of its dense, somewhat layered texture and perfectly "polished" surface with strong metal glance. The surface makes an impression that the crusts was melted and quenched under water. Sample -21X is a common porous Mn-crust with admixture of clay.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-1	1. Rock Type: volcanic, Ol-Plg phyric basalt, fairly fresh 2. Size: Part of block H, original size: 25x15x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, massive, vesicules <1% 6. Phenocrysts: Ol ~5%, upto 2mm, light green (high Fo); Plg ca 5-7%, two generations: megacrysts (upto 1 cm) and normal phenocrysts (2-3 mm) 7. Matrix: well crystallized, intersertal, medium grained 8. Secondary Minerals: outer alteration halo ca 5mm, Ol is altered in this part, Chl in vesicules 9. Encrustations: Mn crust ca. 1cm on original block 10. Comment: this sample represents the core of the original block, its least altered part. Very good for GC and Ar/Ar. Ol is fresh and has high Mg#.	x	x	1 PL	Plg, Ol		x	TS in Airfreightbox	
SO249-DR124-2	1. Rock Type: volcanic, Ol-Plg phyric basalt, moderately to slightly altered. 2. Size: part of block E of original size 28x17x17cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey to slightly brownish 5. Texture / Vesicularity: porphyric, massive with rare vesicules 6. Phenocrysts: Plg -20%, up to 5mm, fresh; two generations as in sample -1; Ol - 5% up to 2mm, altered 7. Matrix: well crystallized, intersertal 8. Secondary Minerals: Chl and Serp after Ol, Chl in vesicles, wide halo of alteration 9. Encrustations: clay and Mn crust on surface, rare cracks 10. Comment: similar to sample -1 but more altered; Ol altered, Plg fresh. Relatively good for GC and Ar/Ar dating on Plg.	x	x	2 PL	Plg		1	TS in Airfreightbox	
SO249-DR124-3	1. Rock Type: volcanic, Ol-Plg phyric basalt, pillow lava fragment, slightly to moderately altered. 2. Size: 25x20x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with white spots, black glass rind 5. Texture / Vesicularity: porpyric; slightly vesicular (<1%, <1mm) 6. Phenocrysts: Plg (10%, up to 1cm, fresh), OL (1-2%, up to 1 mm, fresh) 7. Matrix: very fine crystallized to glassy; glass margin on one side 8. Secondary Minerals: some oxidation, Chl in vesicles 9. Encrustations: abundant cracks filled with Mn-Fe hydroxides; clay in cracks; outer Mn crust ca 1-2 cm 10. Comment: the smple is similar to samples -1 and -2 but represents well quenched part of pillow lava. A lot of fresh glass, fresh Plg and Ol. WR is not good for GC because of abundant cracks and veins.	x	x	1	Ol, Plg, Gl		x		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-4	1. Rock Type: volcanic, Ol-Plg phyric basalt, fairly fresh 2. Size: 13x12x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey to black in glassy part 5. Texture / Vesicularity: strongly porphyric, massive with rare tiny vesicles 6. Phenocrysts: Plg - two generations: megacrysts upto 1cm 2% in total, small phenocrysts ca 10% <5mm, all fresh. Ol - 3-5%, up to 6mm, fresh 7. Matrix: holocrystalline, glass rind 8. Secondary Minerals: minor altertion in style descibed for sample -3 9. Encrustations: abundant veins, oxidation 10. Comment: similar to sample -3. Two generations of phenocrysts are particularly well evident . Fresh, Ol, Pl, glass. Care should be taken to separate the freshest parts for GC. Second generation Pl should be picked for Ar/Ar dating.	x	x	1 PL	Ol, Plg, Gl		3	TS in Airfreightbox	
SO249-DR124-5	1. Rock Type: volcanic: ol-pl-phyric basalt fairly fresh. Similar to -4 2. Size: 13x13x9 cm 3. Shape / Angularity: 4. Color of cut surface: 5. Texture / Vesicularity: 6. Phenocrysts: 7. Matrix: fine-grained 8. Secondary Minerals: 9. Encrustations: 10. Comment: Sample similar to -4, contains fresh Plg, Ll, glass. Good for GC, Ar/Ar but slightly more altered than -4. Some picking is required to avoid altered part.	x	x	1	Ol, Plg, Gl			TS in Airfreightbox	
SO249-DR124-6	1. Rock Type: volcanic, Ol-Plg phyric basalt 2. Size: 15x9x8 cm 3. Shape / Angularity: subangular, fragment of pillow lava 7. Matrix: fine-grained 10. Comment: similar to -3 to -5, but has less Plg (~ 5-7 %) and no first generation large megacrysts, contains fresh Plg, Ol, glass	x	x	1	Ol, Plg, Gl				
SO249-DR124-7	1. Rock Type: volcanic, Ol-Plg phyric basalt, slightly altered 2. Size: 12x10x8 cm 7. Matrix: fine-grained 10. Comment: similar to -3 -6, particularly -6. Fresh Ol, Plg, glass. Good for GC but needs some picking to exclude veins with Mn and yellowish, more altered parts.	x	x	1	Ol, Plg, Gl				

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-8	1. Rock Type: volcanic, Ol-Plg phyric basalt, fragment of pillow lava, fairly fresh, abundant glass 2. Size: 23x17x8 cm 7. Matrix: fine-grained 10. Comment: similar to -3 to -7. Contains fresh Plg, Ol, glass. Good for GC and Ar/Ar	x	x	1	Ol, Plg, Gl				
SO249-DR124-9	1. Rock Type: volcanic: Ol-Plg phyric basalt, slightly to moderately altered, pillow fragment 2. Size: 14x10x8 cm 7. Matrix: fine-grained 10. Comment: similar to other samples from the dredge	x	x	2	Ol, Plg, Gl				
SO249-DR124-10	1. Rock Type: volcanic, Ol-Plg phyric basalt, fresh, pillow fragment 2. Size: 14x10x8 cm 7. Matrix: fine-grained 10. Comment: similar to other samples, fresh Ol, Plg, glass. Also good for GC, but Mn veins should be avoided by careful picking	x	x	1	Ol, Plg, Gl				
SO249-DR124-11	1. Rock Type:cvolcanic, ol-pl-phyric basalt, fragment of pillow lava with hyaloclastite attached 2. Size: 19x12x7cm 7. Matrix: fine-grained 10. Comment: similar to other samples, fresh Ol, Plg, glass. Not good for bulk GC because of veins	x	x	1	Ol, Plg, Gl				
SO249-DR124-12	1. Rock Type: volcanic, rare Ol-Plg phyric basalt, fresh 2. Size: 19x17x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Pl:g ~ 5-7 % < 5 mm 7. Matrix: fine-grained, glassy 8. Secondary Minerals: minor alteration typical also for other samples 9. Encrustations: Mn crust, few cracks 10. Comment: contains more Plg + Ol compared to other samples. Very good for GC. Few veins should be picked out	x	x	1	Ol, Plg, Gl				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-13	1. Rock Type: volcanic, Ol-plg phyric basalt, moderately to slightly altered, fragment of pillow 2. Size: 12x10x7 cm 7. Matrix: fine-grained: 10. Comment: similar to predominat type of basalts from the dredge, veins are relatively abundant and should be picked out for GC, fresh Ol, Plg, glass	x	x	1	Ol, Plg, Gl				
SO249-DR124-14	1. Rock Type: volcanic, Ol-Plg phyric basalt 2. Size: 10x8x8 cm 3. Shape / Angularity: 4. Color of cut surface: 5. Texture / Vesicularity: 6. Phenocrysts: 7. Matrix: fine-grained 8. Secondary Minerals: 9. Encrustations: 10. Comment: similar to sample -13	x	x	2	Ol, Plg, Gl				
SO249-DR124-15	1. Rock Type: consists of two consolidated parts: volcanic, CPx - Plg phyric, moderatly altered basaltic andesite (A), and volcanoclastic breccia (B) 2. Size: part of block F, original size 17x17x29 cm 3. Shape / Angularity: subangular 4. Color of cut surface: (a) part (volcanic): grey in central parts, brown at outer parts (b) breccia - greyish-brown A: 5. Texture / Vesicularity: massive, moderately vesicular ~2-3%, most vesiculs ate filled with white zeolith (?) 6. Phenocrysts: Plg 5-7 %, 0.2 up to 1 cm size, milky, greyish, matt, not transparent, Cpx ~ 3 %, ~ 0.5 - 2 mm, dark green 7. Matrix: medium fine-grained, Mt (?) matrix 8. Secondary Minerals: stronger oxidation of matrix in halo and less oxidization in central parts 9. Encrustations: zeolithe (?) 10. Comment: as the sample is quite contrasting to predominant type of basalts in the dredge (cpx-pl and vesiculs) can be considered as a dropstone. B: Breccia, consists of angular pieces (rocks as (A) and more glassy clasts) of different sizes up to several cm 4. Color of cut surface: brown (majority of pieces) cm to greenish 5. Texture / Vesicularity: clastic, clasts of brownish alpha-beta as (A) and more glassy-brownish to greyish and vesicular clasts 7. Matrix: cement is possibly close to glassy clasts 9. Encrustations: all the samples (A+B) are covered by Mn crust (up to 3 cm) similar to all other samples in the dredge 10. Comment: possibly these samples were coming from a subaerial arc setting. This is based on a different petrography: vesicular type and glassy vesiculat clasts in breccia. subaerial - from oxidizing alteration of clasts in breccia (B) and halo in alpha-beta part (A)	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-16	1. Rock Type: sediment, volcanic, rather altered, rare pl-(ol)-phyric basalts. 2. Size: 14x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive, moderately vesicular, - first % look partly altered 6. Phenocrysts: rare Plg (1-2%), more rare Ol < 1% 7. Matrix: micro aphyric structure - Plg dominates. brown alteration for 15-20 % of micolithes , pl or opx microlithes 8. Secondary Minerals: zeolithe in vesicles 9. Encrustations: Mn-crust up to 5 mm 10. Comment: not very good for GC	x	x						
SO249-DR124-17	1. Rock Type: volcanic, moderately altered, alpha-pl-phyric basalt, relatively porphyric, looks like a cummulative sample 2. Size: 13x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey, slightly brownish 5. Texture / Vesicularity: massive, rare vesicules 6. Phenocrysts: Plg ~5 %; Ol: ~5% single and in aggregates 7. Matrix: crystallized, Ol and Plg in matrix 8. Secondary Minerals: Ol oxidation 9. Encrustations: Mn-crust up to 5 mm	x	x						
SO249-DR124-18	1. Rock Type: volcanic, moderately altered (oxidation along cracks and Ol), Plg-Ol-phyric basalt 2. Size: 7x10x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey and slightly brownish, more brownish at edges 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg ~2-3 %, 0,2 - 1 cm + Plg xenocrysts up to 2 cm; Ol: 2-3 %, 0,5 - 2 mm, Ol is partly oxidized 7. Matrix: fine-grained 8. Secondary Minerals: - 9. Encrustations: Mn crust 10. Comment: similar to predominant type of basalts from the dredge	x	x						
SO249-DR124-19	1. Rock Type: sedimentary, silty mudstone, moderately altered 2. Size: 16x6x5 cm 7. Matrix: fine-grained 10. Comment: a single piece of this type maybe dropstone								
SO249-DR124-20	1. Rock Type: sedimentary, Mn crust with glance surface 2. Size: 16x12x4 cm 7. Matrix: fine-grained								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124-21	1. Rock Type: Mn-crust, porous 2. Size: 12x10x5 cm 7. Matrix: fine-grained								
SO249-DR124-22	1. Rock Type: sedimentary 2. Size: 7. Matrix: fine-grained								no picture taken
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR124 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR125

Alpha Fracture Zone: The deepest part of F.Z. facing to Kommandor Graben

Dredge on bottom UTC 29/07/16 5:51hrs, lat 55°47.86'N, long 167°21.52'E, depth 4215 m

Dredge off bottom UTC 29/07/16 07:15hrs, lat 55°48.30'N, long 167°21.65'E, depth 3668 m

total volume: a few rocks

Comments: Volcanoclastic breccia, cherty silt, subvolcanic and intrusive rocks (intermediate to more acid: andesite, gabbro-diorite, two-mica granodiorite).
Samples 1A to 1H are various clasts of volcanic and intrusive rocks in breccia cemented by sedimentary silty matrix. Samples -1F, -1G, -1H represent the breccia itself. Samples -6 and - 7 are another pieces of breccia similar to sample -1. Samples -2, -3, and -8 are loose rock fragments from the dredge, which are similar to clasts in the breccia. Sample -4 is silty chert with tuff component.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR125-1A	1. Rock Type: beccia (intrusive-,volcano-, and tuff clastic) in sedimentary (silt) cement, intrusive; gabbro-diorite 2. Size: part of block J in original size 32x24x16 cm, 1A size 10x9x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg ~55-60%, CPx ~25%, Opx ~15%, sulfides ~2%, size up to ~5mm, Cpx possibly partly replaced by Act 9. Encrustations: thin brownish to greyish films, as for all blocks from -1 10. Comment: as a reference sample for 1B, 1C	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR-125-1B	1. Rock Type: gabbro-diorite, similiar to 1A 2. Size: 6x8x10 cm	x	x						
SO249-DR-125-1C	1. Rock Type: gabbro-diorite similar to 1A 2. Size: 5x5x8 cm	x	x						
SO249-DR-125-1D	1. Rock Type: volcanic (Amph)-Plg phyric andesite 2. Size: 6x7x9cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, ~1% versicular 6. Phenocrysts: Plg 5-7%, Amph ~2% (mostly up to 0.5 cm, up to 1mm replaced with Chl-Act (?) 7. Matrix: evenly crystallized, Plg microlites and matrix 9. Encrustations: as for all blocks - thin spotty brownish, greyish films	x	x						
SO249-DR-125-1E	1. Rock Type: subvolcanic (~andesite) 2. Size: 7x8x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, rare porphyric 6. Phenocrysts: Plg ±Amph (?) ~1% and 1%, scattered in groundmass, Amph (or CPx), elongated crystals replaced with Chl-Act up to 0.5 cm segregations of Plg-Amph occur up to 1cm 7. Matrix: evenly crystal Plg-Act microlites 8. Secondary Minerals: Chl-Act often Amph								
SO249-DR-125-1F	1. Rock Type: breccia (volcanic-sedimentary-intrusive) 2. Size: 8x9x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-brownish, different dark-light 5. Texture / Vesicularity: mix of different clasts: intrusive-gabbro diorite ~similar to -1A, marble, sandstone, effusive, altered andesite and larger block-clast of pegmatoid-type Mica-Fsp rock 7. Matrix: grey-brownish silt	x							
SO249-DR-125-1G	1. Rock Type: Breccia ±similar to -1F, also has intrusive, effusive etc, fsp-mica rock, in silt matrix	1							

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR-125-1H	1. Rock Type: breccia sample with one subangular, grey block of micro-dolerite (?) (looks like medium grained sandstone) but quite heavy for sediment rock, cutted by veins of Fsp (±Qtz), Amph at veins edges 2. Size: 5x6x10 cm	x	x						
SO249-DR-125-2	1. Rock Type: subvolcanic, mixed cast of andesite to leuco gabbro-diorite 2. Size: 7x12x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive 10. Comment: mixing of two varieties occured in volcanic system not during sedimentation	x	x						
SO249-DR-125-3	1. Rock Type: subvolcanic, micro-gabbro-diorite 2. Size: 6x7x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, evenly crystallized (like medium-grained sandstone) 9. Encrustations: has brownish halo ~0.5cm	x	x						
SO249-DR-125-4	1. Rock Type: sedimentary, silt (or cherty silt) with tuff component, volcanoclastic 2. Size: 6x10x15cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with brownish shadow 5. Texture / Vesicularity: massive 7. Matrix: fine grained, uneven grain size distribution, with grains of distruction of andesite/microdiorites contains schlieren and elongated clasts of micodiorites with pyrite (sulfides) in central parts 10. Comment: looks similar to cement of breccia sample -1	x							
SO249-DR-125-5	1. Rock Type: sedimentary (cherty silt), volcanoclastic, similar to -4 2. Size: 5x8x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: micro folded layers of pyrite (slf), doesn't visually contain sub-volcanic clasts	x							
SO249-DR-125-6	1. Rock Type: sedimentary volcanoclasitc breccia (cherty silt) 2. Size: 5x7x10cm 3. Shape / Angularity: angular 4. Color of cut surface: dark gey with brownish shadow 5. Texture / Vesicularity: massive 7. Matrix: similar to -4, -5 with rock-clasts up to ~2cm 10. Comment: type o breccia-similar to -1F	x							

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR-125-7	1. Rock Type: volcanoclastic breccia 2. Size: 6x7x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: different, light-dark grey, greensih-brownish 5. Texture / Vesicularity: massive 7. Matrix: same as -4, -5, volcanoclasts occupy ~50-70% 10. Comment: similar to -1F but clasts are smaller here, up to 2-3cm	x							
SO249-DR-125-8	1. Rock Type: Intrusive, two micas granodiorite 2. Size: 10x12x20 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light-blueish-greyish 5. Texture / Vesicularity: massive 6. Phenocrysts: two Fsp"s, Bt, Msc, (Qtz) 9. Encrustations: spotty browny films 10. Comment: same type of rock was included as a clast in beccia -1F	x							
SO249-DR125 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR126

Volcanologists massif, NE of Piip, NNE-SSW trending ridge NE of Piip. WNW slope from middle section to top

Dredge on bottom UTC 29/07/16 13:29hrs, lat 55°27.34'N, long 167°30.23'E, depth 2954 m

Dredge off bottom UTC 29/07/16 15:02hrs, lat 55°27.02'N, long 167°30.46'E, depth 2384 m

total volume: 3/4 full

Comments: mostly lava fragments, angular, few dropstones some breccias

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-1	1. Rock Type: volcanic, aphyric basalt, almost fresh 2. Size: part of block H, orignal size 25x19x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric with few small-size vesicles 6. Phenocrysts: few Plg phenocrysts up to 2 mm long, olivine phenocrysts are not visible 7. Matrix: crystallized fine-grained groundmass 8. Secondary Minerals: partly altered but no clear zonation 9. Encrustations: Mn-crust ~0.5cm on original block 10. Comment: this sample is part of large block. Aphyric, very good for GC (bulk rock), Ar/Ar on groundmass	x	x	1	Plg		x	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-2	1. Rock Type: volcanic, aphyric basalt, partly altered, similar to -1, glassy margin 2. Size: cut before measurement, approx. 15x15x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to slightly brownish 5. Texture / Vesicularity: aphyric, vesicularity, from fine to medium-size vesicles <5% 6. Phenocrysts: very few Plg phenocrysts, up to 1mm long 7. Matrix: fine-grained matrix, Plg 8. Secondary Minerals: yellowish to brownish colored matrix 9. Encrustations: Mn crust uo to 0.5cm, cracks 10. Comment: the rock is similar to -1, more altered, aphyric good for GC (bulk rock) but partly altered, Ar/Ar on groundmass, Glass	1	1	1	glass, Plg				
SO249-DR126-3	1. Rock Type: volcanic, aphyric, similar to -1, -2 2. Size: 22x15x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: same as -2 5. Texture / Vesicularity: less small vesicles but more large vesicles as in -2 8. Secondary Minerals: Chl in vesicles, brownish colour 9. Encrustations: Mn- crust up to 1cm 10. Comment: the rock is similar to -1 and -2. Aphyric basalt, good for GC (but sighlty altered), groundmass can be used for Ar/Ar	x	x	1					
SO249-DR126-4	1. Rock Type: volcanic, aphyric basalt with few phenocrysts of Plg partly altered 2. Size: 18x14x8 cm 3. Shape / Angularity: same as -1 to -3 5. Texture / Vesicularity: small-size vesicles only, <10%, aphyric 8. Secondary Minerals: yellowish to brownish color, clearly-seen zonation vesicles filled with secondary minerals 9. Encrustations: thin Mn-crust, 2-3 mm 10. Comment: this rock is similar to -1 to -3, less large bubbles GC can be affected by alteration, probably good for Ar/Ar on groundmass	x	x	1	Plg				
SO249-DR126-5	1. Rock Type: volcanic, Plg-basalt, partly altered, porphyritic 2. Size: part of block W, 33x22x9 cm 3. Shape / Angularity: subanglar 4. Color of cut surface: grey to yellow-brownish 5. Texture / Vesicularity: porphyritic, vesicular matrix and small to medium size vesicles (<2-3mm) with rare large vesicles (up to 1cm) 6. Phenocrysts: Plg, two generations, up to 2mm and up to 8mm, <10%; few olivines 7. Matrix: vesiculated fine-to medium grained groundmass 8. Secondary Minerals: partly altered with relief, very fresh core, cracks most vesicles do not contain/secondary minerals 9. Encrustations: 5-10 mm thick Mn crust, clay 10. Comment: this rock represents Plg phyric basalt with large vesicles and highly vesiculated groundmass. Good for GC (but partly altered). Probably Ar/Ar on large and small Plg phenocrysts.	x	x	2 (Plg)	Plg			TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-6	1. Rock Type: volcanic, Ol-Pl basalt, fairly fresh, vesiculated 2. Size: part of block F (19x20x13) 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, massive vesicles or mostly 1-4mm in size with some large up to 1 cm (elongated) 6. Phenocrysts: Plg (<10%; mostly up to 4mm but a few megacrysts up to 1.2cm), Ol (< 2%, up to 5mm) 7. Matrix: vesicular, medium-size grained, Plg, Ol 8. Secondary Minerals: secondary minerals inside vesicles 9. Encrustations: thin Mn-crust (<2mm) 10. Comment: this sample is a Ol-Plg basalt, fairly fresh, good for GC and Ar/Ar	x	x	1	Ol, Plg			TS in Airfreightbox	
SO249-DR126-7	1. Rock Type: volcanic, Plg phyric basalt, partly altered 2. Size: part of block S, 24x17x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 5. Texture / Vesicularity: porphyritic, vesicular groundmass, vesicularity <5%, 1-4mm sized vesicles but some up to 2cm 6. Phenocrysts: Plg (<5%) most of Plg phenocrysts 0.5x3mm, few megacrysts up to 1cm 7. Matrix: vesiculated groundmass 8. Secondary Minerals: alteration along cracks and secondary minerals inside bubbles/vesicles 9. Encrustations: Mn-crust up to 0.5cm thick 10. Comment: this sample represents Plg phyric basalt, fairly fresh, good for GC, Ar/Ar on large Plg and groundmass	x	x	2 (Plg, groundmass)	Plg				
SO249-DR126-8	1. Rock Type: volcanic, Plg basalt 2. Size: 20x20x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: pophyritic, slightly vesicular, vesicles <4mm, most < 1mm 6. Phenocrysts: Plg <10%, 1-2mm, some up to 5mm 7. Matrix: vesiculated, fine-grained, interstitial matrix 8. Secondary Minerals: some alteration in groundmass, yellowish colour most of vesicles are free from secondary minerals 9. Encrustations: vey thin Mn-crust 10. Comment: this rock represents Plg-basalt, fairly fresh, good for Ar/Ar	x		1	Plg				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-9	1. Rock Type: volcanic, Ol-Plg basalt partly altered 2. Size: 16x12x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, Plg few Ol, slightly vesicular groundmass, vesicularity <10%, 1-3mm size vesicles, elongated large vesicles up to 1cm long 6. Phenocrysts: Plg <7%, Ol<1%, Plg<2mm long, some large phenocrysts up to 8mm 7. Matrix: fine-grained matrix, few vesicles, massive, intersertial 8. Secondary Minerals: some alteration on Plg and Ol, vesicles partly filled with secondry minerals 9. Encrustations: Mn crusts up to 5mm 10. Comment: this rock is Ol-Plg-basalt similar to -8 but contains Ol, fresh with some alteration along cracks and inside vesicles, good for GC and Ar/Ar	x	x	1	Ol, Plg				
SO249-DR126-10	1. Rock Type: volcanic, Ol-Plg-basalt, fairly fresh with some alteration along cracks ad vesicles 2. Size: 15x10x8 cm 3. Shape / Angularity: subangluar 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, massive groundmass almost without vesicles, vesicularity (<5%, <1-4mm vesicles) 6. Phenocrysts: Plg (<10%, 1-2mm up to 5mm), Ol (<2%, up to 3-4mm) 7. Matrix: groundmass is well crystallized, almost without vesicles massive, intersertial, medium grained 8. Secondary Minerals: alteration along cracks and within vesicles, some Plg phenocrysts also altered (yellowish colour) 9. Encrustations: <1mm thick Mn crust 10. Comment: this sample represents Ol-Plg-basalt, fresh, good for GC (although with some alteration), good for Ar/Ar	x	x	1					
SO249-DR126-11	1. Rock Type: volcanic, Plg-basalt, altered groundmass 2. Size: 21x18x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, vesiculated groundmass, vesicularity (<2%, 1-5mm) 6. Phenocrysts: Plg (<5%, 1-12mm) 7. Matrix: vesiculated, fine-grained groundmass, partly altered 8. Secondary Minerals: relatively fresh core, alteration in outer parts, brownish secondary minerals in small vesicles in groundmass, alteration along cracks 9. Encrustations: < 1mm thick Mn-crust 10. Comment: this sample is a Plg-basalt with large Plg phenocrysts, partly altered, relatively good for GC and good for Ar/Ar (Plg appears fresh)	x	x	1	Plg				

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-12	1. Rock Type: volcanic, Plg-basalt, elongated, aligned vesicles, chains of vesicles 2. Size: 19x11x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic vesiculated (<15%), elongated vesicles (up to 2cm long), many small vesicles forming long chains, parallel to the elongation of large vesicles 6. Phenocrysts: Plg (<2%), 1-4mm 7. Matrix: fine grained vesiculated groundmass 8. Secondary Minerals: slighlty altered, secondary minerals inside vesicles, Plg appears fresh 9. Encrustations: thin Mn crust 10. Comment: this sample is similar to -11 but has a specific chains of vesicles in the groundmass and elongated large vesicles, good for GC and for Ar/Ar								
SO249-DR126-13	1. Rock Type: volcanic, Plg-basalt, small phenocrysts 2. Size: 21x10x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: phyric to aphyric, very small Plg phenocrysts, vesicular groundmass, a few vesicles in the sample 6. Phenocrysts: Plg (<1mm, 2%) 7. Matrix: fine grained vesiculated groundmass 8. Secondary Minerals: brownish alteration in vesicles, alteration in groundmass 9. Encrustations: thin Mn-crust 10. Comment: this sample represents fine-grained, Plg-basalt. Almost fresh with some alteration in the vesicles and along cracks. Good for GC.	x	x		Plg				
SO249-DR126-14	1. Rock Type: volcanic, Plg-basalt, almost aphyric 2. Size: 14x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: Plg <5%, <1mm, porphyric to aphyric, some vesicles in the groundmass 7. Matrix: fine grained groundmass, massive with some vesicles 8. Secondary Minerals: almost fresh, some alteration along cracks 9. Encrustations: thin Mn-crust 10. Comment: this sample represents porphyric to aphyric Plg-basalt, almost fresh, good for GC	x	x		Plg				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-15	1. Rock Type: volcanic, Plg-basalt, partly altered, chilled margin 2. Size: 25x17x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, vesiculated (<10%), vesiculated groundmass vesicles (<1 to 5mm) 6. Phenocrysts: Plg phenocrysts (<10%, <1-2mm) 7. Matrix: fine-grained groundmass, partly vesiculated 8. Secondary Minerals: alteration along cracks and within vesicles some Plg also altered 9. Encrustations: thin Mn-crust, glassy margins 10. Comment: this sample represents Plg-basalt, partly altered, vesiculated, glass	x			glass, Plg				
SO249-DR126-16	1. Rock Type: volcanic, Pl-basalt, almost aphyric, vesicular 2. Size: 18x14x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey 5. Texture / Vesicularity: almost aphyric with some Plg phenocrysts (small), highly vesiculated (<15%) 6. Phenocrysts: very few Plg phenocrysts (<1%, <1mm) 7. Matrix: fine-grained groundmass, vesiculated 8. Secondary Minerals: yellowish alteration along cracks and inside vesicles 9. Encrustations: very thin Mn-crust and clay 10. Comment: this sample represents Plg basalt with almost aphyric texture. Vesicular and partly altered.	x			Plg				
SO249-DR126-17	1. Rock Type: volcanic, Plg-basalt very similar to -16 2. Size: 14x13x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: see -16 6. Phenocrysts: very few Plg 10. Comment: Plg basalt, vesiculated almost aphyric, partly altered	x	x		Plg				
SO249-DR126-18	1. Rock Type: volcanic, Plg-basalt breccia, almost aphyric, altered 2. Size: part of block N (63x28x17 cm), 19x13x10 cm sampled piece 3. Shape / Angularity: subangular 4. Color of cut surface: grey to dark grey 5. Texture / Vesicularity: almost aphyric, highly vesiculated 6. Phenocrysts: Plg (<1%, 1mm) 7. Matrix: fine-grained groundmass, vesiculated 8. Secondary Minerals: altered 9. Encrustations: thin Mn-crust 10. Comment: volcanic breccia, almost aphyric, vesiculated, altered				Plg				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR126-19	1. Rock Type: volcanic, Plg-basalt, similar to -18 but with glassy margin 2. Size: part of block R (30x16x14 cm) 10. Comment: this sample is taken for glassy margin, glass				Plg				
SO249-DR126-20	1. Rock Type: volcanic, similar to -18 and -19, Plg-basalt, glassy margin 2. Size: 15x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to dark grey 10. Comment: volcanic basaltic beccia with glassy margin, glass				glass				
SO249-DR126-21	1. Rock Type: volcanic, basalt 2. Size: 9x5x5 cm 10. Comment: this sample is taken for glassy margin, glass				glass				
SO249-DR126-22	1. Rock Type: volcanic, basalt, aphyric, vesiculated 2. Size: 8x6x5 cm 10. Comment: this sample is taken for glassy margin, glass				glass				
SO249-DR126 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR127

Volcanologists massif, Eastern flank, near crest of the ridge

Dredge on bottom UTC 29/07/16 17:59hrs, lat 55°20.19'N, long 167°28.42'E, depth 2548 m

Dredge off bottom UTC 29/07/16 19:12hrs, lat 55°20.57'N, long 167°28.29'E, depth 2158 m

total volume: 1/2 full

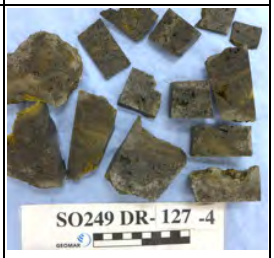
Comments: Pillow fragments up to 0.5 m ø, hyaloclastites, dropstones, mud

Four major types of rocks:

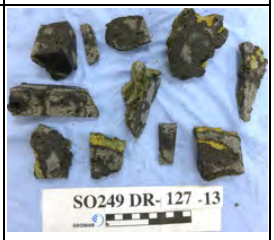
1. Predominant type is strongly (~20 %) Ol-Plg-phyric pillow-lavas, hyaloclastites; mini-pillow (eggs) (-7 to -16). Most rocks have thick glassy margins. A few samples of this type have very large voids, uneven outer surface and no glass. They represent likely subaerial eruptions (-11).
2. Less abundant are vesicular Ol-Plg-phyric basalts of slightly brownish color (#3-6). Sample -17 in inclusion of type 2 in type 1. Some samples have glassy margin.
3. Rare Plg-phyric basalts without glass, which are similar to basalts from DR126. A typical feature of these rocks are vesicles forming chains parallel to each other.
4. Rhyolite pumice. Several small fragments and one large ~0.5 m block. Rare Mg, OPx, Amph and small xenoliths of basalt.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR127-1	1. Rock Type: volcanic, rare Plg (Ol, CPx) phyric basalt, fresh 2. Size: 20x12x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, vesicular ~5-7%, elongated in parallel chains 6. Phenocrysts: Plg (~2%; ≤ 1.5mm), single crystals of Ol (<1mm) and CPx (<0.5mm) 7. Matrix: fine grained 9. Encrustations: thin Mn film on surface, minor oxidation 10. Comment: good for GC and Ar/Ar. Together with -2 represents one of four major rock types in dredge.	x	x	x	Plg (Ol,CPx)		x	TS in Airfreightbox	
SO249-DR127-2	1. Rock Type: volcanic, rare Plg phyric basalt, fresh, analog to -1, fragment of block M 2. Size: original size 35x25x23 cm 10. Comment: good for GC an Ar / Ar	x	x						
SO249-DR127-3	1. Rock Type: volcanic: Ol-phyric andesit basalt, fresh 2. Size: 21x9x19 cm 3. Shape / Angularity: rounded fragment of lava tube / pillow 4. Color of cut surface: dark grey, slightly brownish 5. Texture / Vesicularity: porphyritic, vesicular (~10%, mostly ≤1mm, some up to 2 cm) 6. Phenocrysts: Ol (~5-7%, ≤ 1mm), Plg, perhaps some small micro phenocrysts 7. Matrix: fine grained, hyalopilitic, glassy 8. Secondary Minerals: some oxidation, palagonite fillings in vesicles and outside surface 9. Encrustations: some white stuff, thin Mn film 10. Comment: representativ sample for type 2, high Mg basalt or basaltic andesite in the dredge, fresh and good for any GC work	x	x	?	Ol, Glass		x	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

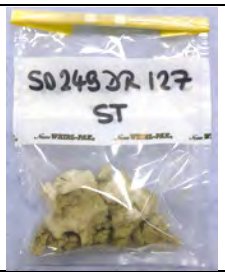
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR127-4	1. Rock Type: volcanic, Ol phyric basalt (?), fresh, similar to sample -3 2. Size: 15x10x10 cm 10. Comment: somewhat more fluidal compared to -3, good for GC, no glass	x	x		Ol, Plg(?)				
SO249-DR127-5	1. Rock Type: volcanic, Ol phyric basalt (?), fresh, similar to sample -3 2. Size: 9x8x9 cm 10. Comment: fresh, Ol + Glass, good for GC	x	x		Ol, Plg (?), Glass				
SO249-DR127-6	1. Rock Type: volcanic:Ol-phyric basalt (?) similar to sample -3 2. Size: 10x9x7 10. Comment: fresh. Ol,Glass. Good for GC.	x	x		Ol, Plg (?), Glass				
SO249-DR127-7	1. Rock Type: volcanic, Ol-Plg-phyric basalt, fresh, pillow fragment 2. Size: Fragment of bloc E original size 40x20x15 cm 3. Shape / Angularity: angular, pillow fragment 4. Color of cut surface: dark grey with light spots 5. Texture / Vesicularity: porphyritic, vesicular (~10-15%, ≤ 2cm, elongated) 6. Phenocrysts: Ol (~10%, ≤2mm, fresh), Plg (~10 %, ≤2mm, fresh), perhaps some CPx (?) 7. Matrix: fine crystallized, glassy 8. Secondary Minerals: palagonite on vescile walls 9. Encrustations: clay, minor Mn film on surface 10. Comment: reference sample for major type from the dredge, good for all kinds of GC	x	x	x	Ol, Plg, Px, Glass		x	TS in Airfreightbox	
SO249-DR127-8	1. Rock Type: volcanic, Ol-Plg-phyric basalt, similar to -7 2. Size: 27x25x12 cm (part of block Y) 5. Texture / Vesicularity: strongly vesicular, large (≤3-5mm) close to glassy rind, small (≤1-2 mm) in inner part 6. Phenocrysts: Ol, Glass, Plg,all fresh 10. Comment: fresh and good for GC	x	x	x	Ol, Plg, Glass		7		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR127-9	1. Rock Type: volcanic, Ol-Plg-phyric basalt, similar to -7 2. Size: 45x20x20 cm original size, fragment of bloc Q 10. Comment: amount of crystals is somewhat higher than in -7, up to 25-30%. Ol/Pl ~50/50, fresh and good for all GC types	x	x	x	Ol, Plg, Glass				
SO249-DR127-10	1. Rock Type: volcanic, Ol-Plg phyric basalt similar to -7, A fragment of a pillow 2. Size: 23x22x6 cm 10. Comment: fresh and good for GC. Some palagonite in vesicles. Otherwise it is good for GC. Contains fresh Ol, Plg, glass	x	x	1	Ol, Plg, Glass		7		
SO249-DR127-11	1. Rock Type: volcanic, Ol-Plg phyric basalt. Petrographycally similar to -7 2. Size: 27x14x6 cm 10. Comment: unlike other samples from this drege this sample has characteristic surface of subaerally erupted lavas. No glass = slow cooling by air. Fresh and good for GC.	x	x	1	Ol, Plg, Glass		7		
SO249-DR127-12	1. Rock Type: volcanic, Ol-Plg phyric basalt?, similar to -7 2. Size: 20x21x14 cm 10. Comment: fresh and good for GC, Ol, Plg, Glass!	x	x	1	Ol, Plg, Glass		7		
SO249-DR127-13	1. Rock Type: volcanic, Ol-Plg phyric basalt, similar to -7, fragment of small glassy mini-pillow 2. Size: 20x9x7 cm 10. Comment: Very porphyritic up to 30%. Large crystals of Ol and Plg. Nice for glass, Ol, Plg, melt inclusions!	x	x	1	Ol, Plg, Glass		7		
SO249-DR127-14	1. Rock Type: volcanic, Ol-Plg phyric basalt. Petrographycally similar to -7. A fragment of minipillow - glass egg 2. Size: 13x10x5 cm 6. Phenocrysts: Ol+Plg = ~30% up to 2mm 8. Secondary Minerals: some palagonite after glass and in vesicles 10. Comment: nice small sample for glass, Ol, Plg	x	x	1	Ol, Plg, Glass		7 13		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR127-15	1. Rock Type: volcanic, Ol-Plg basalt, small glassy pillow with larg void inside 2. Size: 12x10x5 cm 10. Comment: nice small sample for glass, Ol, Plg, melt inclusions study	x	x	1	Ol, Plg, Glass		7 13		
SO249-DR127-16	1. Rock Type: volcanic, Ol-Plg basalt, similar to -7, fragment of small lava tube/pillow 2. Size: 15x8x8 cm 10. Comment: good glass, fresh Ol, Plg	x	x	1	Ol, Plg, Glass		7		
SO249-DR127-17	1. Rock Type: volcanic, inclusion of rare Ol phyric basalt (type 2) in strongly Ol-Plg phyric basalt (type 1). 2. Size: 10. Comment: the sample was taken to illustrate relationships between type 1 (young) and type 2 (older)	x			1		7 (type 1), 3 (type 2)		
SO249-DR127-18	1. Rock Type: volcanic, rhyolite pumice, slightly altered (?) to fresh, fragment of large block L 2. Size: 40x25x25 cm 3. Shape / Angularity: angular 4. Color of cut surface: yellowish grey 5. Texture / Vesicularity: strongly vesicular (~30-40%) 6. Phenocrysts: <1%: Amph (~2mm), Opx (~1mm), Plg (2mm) 7. Matrix: glassy 8. Secondary Minerals: some oxydation, palagonite, likely glass hydration 9. Encrustations: clay and oxydation films 10. Comment: aphyric rhyolite pumice with fresh glass and minerals	x	x		Amph, Opx, Plg, Glass		x		
SO249-DR127-19	1. Rock Type: volcanic: rhyolite pumice. Similar to -18 2. Size: 14x9x9 cm	x	x		1		18		
SO249-DR127-20	1. Rock Type: volcanic, rhyolite pumice, similar to -18 2. Size: 10x5x7 cm	x	x		1		18		

SO249-DR127 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR128

Piip Volcano - top area, upper northern slope of northern cone, along lava flow (?)

Dredge on bottom UTC 30/07/16 00:05hrs, lat 55°25.34'N, long 167°16.40'E, depth 670 m

Dredge off bottom UTC 30/07/16 00:56hrs, lat 55°25.08'N, long 167°16.45'E, depth 460 m

total volume: Full - massive and porous (dacites) / andesites several blocks upto 1 m in diameter, numerous small fragments

Comments:

Varietes ol Ol-Plg to Hbl-Plg (predominates) andesites

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR128-1	1. Rock Type: volcanic, Ol (less)-Plg phyric basaltic andesite, more rare Cpx, Opx, 2. Size: 20x33x40 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to black 5. Texture / Vesicularity: massive, fresh, moderately vesicular 6. Phenocrysts: Plg (~7% up to 1cm, white or grey with glass matrix ~5%), Ol (~2%, ~0.5-2 mm, light yellow), CPx (~1%, light green), Opx (<1%) 7. Matrix: even matrix with Plg microlites, vesicles and fresh, matrix is dark grey to black 10. Comment: one slice went to Roman Botcharnikov + one piece to archive	x	x		Plg			TS in Airfreightbox	
SO249-DR128-2	1. Rock Type: volcanic, Ol-Plg phyric basaltic andesite with less Cpx (Opx, Hbl) 2. Size: 22x24x35 cm, part of block S 3. Shape / Angularity: angular 6. Phenocrysts: Plg, Ol, Cpx, rare Opx, black Hbl <1% 10. Comment: the remaining part went to archive	x	x		Ol, Plg, Cpx, Hbl		1		
SO249-DR128-3	1. Rock Type: volcanic 2. Size: 12x16x32 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to black 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg, less Ol, Cpx~1% 9. Encrustations: dark brown thin film on original surface 10. Comment: part of the sample went to Natalia Gorbach	x	x		Plg, Ol, Cpx		1		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR128-4	1. Rock Type: volcanic: Plg rare Ol-Cpx phyric basaltic andesite 2. Size: 13x15x18 cm 3. Shape / Angularity: angular - subangular 4. Color of cut surface: dark grey to black 5. Texture / Vesicularity: less massive than -1 to -3, more porous, edges are more spiky, ~"foamed", ~10% vesicles 6. Phenocrysts: less Plg than in -1 to -3, ~5%, Ol ~1%, CPx <1%, rare Hb subphenocrysts in matrix 9. Encrustations: dark brown film around original surface	x	x		Ol, Cpx, Plg, Hbl		1	TS in Airfreightbox	
SO249-DR128-5	1. Rock Type: volcanic, Plg rare Ol-Cpx phyric basaltic andesite 2. Size: 9x11x15 cm 10. Comment: one part went to Natalia Gorbach	x	x		Pl, Ol, Cpx		4		
SO249-DR128-6	1. Rock Type: volcanic, Plg rare Hbl phyric basaltic andesite 2. Size: 18x18x19 cm 3. Shape / Angularity: subangular -> more older than -1 to -3 (?) 5. Texture / Vesicularity: vesicles are small, interconnected to some fluidal texture 6. Phenocrysts: Plg ~5-7%, with some areas (layers) in the sample enriched to 10-15%, Hbl is black, elongated up to 1cm, Cpx-Ol <1% only in sbphencrysts 10. Comment: seems to be more evolved than -4 to -5 and -1 to -3 group	x	x		Plg, Hbl, Cpx, Ol		4	TS in Airfreightbox	
SO249-DR128-7	1. Rock Type: volcanic, Plg-Hbl-rare px phyric basaltic andesite or andesite 2. Size: 12x13x13 cm 3. Shape / Angularity: on edges pumice-like type ~ small "sugar-salt" "crystals" 4. Color of cut surface: dark grey to lighter grey 5. Texture / Vesicularity: massive to layered vesicular ~5-15% 6. Phenocrysts: Plg about 5% in black parts, Hbl about <1% but phenocrysts elongated up to 1.5 cm, CPx <1% subphenocrysts 7. Matrix: Plg 10-15%, Hbl 1-3%, rare CPx 9. Encrustations: some brownish films 10. Comment: beginning stage of layering	x	x		Plg, Hbl, Cpx, Ol				
SO249-DR128-8	1. Rock Type: volcanic, Hbl-Plg phyric andesite 2. Size: 10x16x19 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to light greyish white 5. Texture / Vesicularity: massive, layered, vesicular, not evenly distributed , but in general, in some parts parallel to layering 6. Phenocrysts: grey part = Plg 5%, Hbl 1-2%, OPx <0.5% in subphenocrysts. White part = Plg 10-15%, Hbl 3%, white yellowish matrix 10. Comment: grey "zones" predominate. One part went to Natalia Gorbach	x	2x grey and white		Hbl, Plg, Opx				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR128-9	1. Rock Type: volcanic, Hbl-Plg typical andesite 2. Size: 12x19x20 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive with some layering, vesicles about 3% 6. Phenocrysts: Plg (5-7%, up to 1cm), Hbl (3%, up to 1cm) - Both minerals occur in two generations. OPx in subphenocrysts. In lighter zones Plg up to 15% 7. Matrix: grey and light in white layers 10. Comment: Good for dating, part went to Natalia Gorbach	x	x	1	Hbl, Plg			TS in Airfreightbox	
SO249-DR128-10	1. Rock Type: volcanic, Px-Hbl-Plg phyric andesite 2. Size: 14x17x20 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: less massive than previous, vesicles interconnected about 15-20%, transitional to pumice 6. Phenocrysts: Plg (3% up to 3mm), Hbl (up to 1%), Px (Cpx>Opx) about 1% mostly subphenocristic 7. Matrix: grey, sugar-salt-stallactitic 9. Encrustations: oxydation - brownish layers 2-3cm along outermost part	x	x		Px, Hbl, Plg				
SO249-DR128-11	1. Rock Type: volcanic, Hbl-Plg andesite 2. Size: 15x1x38 cm, part of block W 3. Shape / Angularity: subangular (older?) 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, no vesicles 6. Phenocrysts: Plg ~5%, two generations (not contrasted in size). Hbl ~2% phenocrysts + subphenocrysts. There are some segregations of Plg+small OPx up to 1x0.5cm 7. Matrix: grey, crystallized 9. Encrustations: dark brown films, ~spotty at outer surface 10. Comment: Part went to Natalia Gorbach and Archive	x	x	x	Hbl, Plg				
SO249-DR128-12	1. Rock Type: volcanic, (Opx)-Hbl-Plg andesite 2. Size: 22x35x53 cm, part of block F 3. Shape / Angularity: subangular 4. Color of cut surface: grey a bit brownish 5. Texture / Vesicularity: massive, vesicles ~1%. In general similar to -11 but more altered 6. Phenocrysts: similar to -11 Plg ~5%, Hbl ~2%, OPx in separate segregations with Pl and OPx-Hbl moderated sized 9. Encrustations: brown film around 10. Comment: looks more altered than -11, parts went to Archive	x	x				#11		
SO249-DR128-13X	1. Rock Type: archive of -1 2. Size:								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR128-14X	1. Rock Type: archive of -2 2. Size:								
SO249-DR128-15X	1. Rock Type: archive of-12 2. Size:								
SO249-DR128 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR129
Piip Volcano - top area, upper southwestern slope of central cone
Dredge on bottom UTC 30/07/16 01:46hrs, lat 55°23.72'N, long 167°16.30'E, depth 878 m
Dredge off bottom UTC 30/07/16 02:55hrs, lat 55°23.98'N, long 167°16.12'E, depth 642 m
total volume: full
Comments: A lot of small rock fragments in mud. Small pieces of dacite pumice

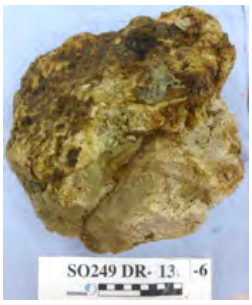
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR129-1	1. Rock Type: volcanic, ~dacite, rare porphyric pumice 2. Size: 8x9x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: white-creme 5. Texture / Vesicularity: massive, vesicles (?) ~5%-10% 6. Phenocrysts: Cpx < 1%, Opx <1%, Plg <1% 7. Matrix: finely porous, white-creme, with Plg, Opx and more rare Hbl in microlites 9. Encrustations: brownish-greenish films	x	x		Cpx, Opx, Plg				
SO249-DR129-2	1. Rock Type: volcanic, ~dacitic, pumice 2. Size: 5x5x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: white-light greyish 5. Texture / Vesicularity: massive, aphyric, vesicles ~5% 7. Matrix: salty-line, Opx (~5%) in microlites (and Plg)								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR129-3	1. Rock Type: volcanic, ~dacite 2. Size: 6x7x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: white-creme 6. Phenocrysts: similar to -1 7. Matrix: similar to -1 8. Secondary Minerals: similar to -1 9. Encrustations: similar to -1				Cpx, Opx, Plg		#1		
SO249-DR129-4	1. Rock Type: volcanic, rare-porphyric, dacite, pumice 2. Size: 6x9x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: white-creme 5. Texture / Vesicularity: massive, vesicles 3-5% 6. Phenocrysts:rare OPx (<1%), Plg (<1%) 7. Matrix: crystallized 10. Comment: contains some lithoclast of grey andesite-dacite. Maybe similar to rock types of DR128	x	x		Opx, Plg				
SO249-DR129 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

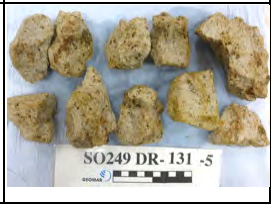
SO249-DR130
Piip Volcano - top area, rift emanating from central cone to the west, upper southern slope
Dredge on bottom UTC 30/07/16 04:20hrs, lat 55°23.72'N, long 167°14.17'E, depth 1129 m
Dredge off bottom UTC 30/07/16 05:09hrs, lat 55°23.95'N, long 167°14.33'E, depth 904 m
Total volume: full
Comments: white pumice, corals, some dropstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR130 -1	1. Rock Type: volcanic, dacite, ~massive pumice 2. Size: 6x12x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: white-yellowish-creme-pinkish 5. Texture / Vesicularity: massiv layered, fluidal (long formed of vesicales along layers?) 6. Phenocrysts: rare Plg ~2-3 mm 7. Matrix: finely porous, crystallized, Plg, more OPx and CPx microlites 9. Encrustations: greenish film around sample 10. Comment: some sort of colored layering, pinkish-whitish-light greyish not expressed in minerology. Layers - some secondary alteration (?)	x	x		Plg				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR130 -2	1. Rock Type: volcanic, dacite, ~pumice 2. Size: 9x9x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: white-greyish 5. Texture / Vesicularity: massive, but more vesicular ten vesicles 10-15%, no layering or fluidal 6. Phenocrysts: aphyric 7. Matrix: rare Opx microlites, less crystallized than -1 9. Encrustations: brownish - greenish films around sample	x	x						
SO249-DR130 -3	1. Rock Type: volcanic, dacite, pumice, aphyric, massive 2. Size: 6x9x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: white 5. Texture / Vesicularity: a bit more massive than -2, large vesicles ~10% 6. Phenocrysts: aphyric 7. Matrix: crystallized, with "white" parts of glass in vesicles 10. Comment: more fresh in comparison to -2 and with others	x	x						
SO249-DR130 -4	1. Rock Type: volcanic, dacite aphyric, massive, pumice 2. Size: 9x11x19 cm 3. Shape / Angularity: subangular 4. Color of cut surface: white - greyish 5. Texture / Vesicularity: similar to -3 8. Secondary Minerals: brownish films around 10. Comment: contains small segregations of Plg+OPx up to 3mm	x	x		Plg, Opx				
SO249-DR130 -5	1. Rock Type: volcanic, dacite pumice, similar to -3 and -4 2. Size: 6x8x12 cm 5. Texture / Vesicularity: has large vesicles ~10% up to ~1cm together with smaller ones, with glassy spikes and hairs 10. Comment: could be good for glass separation	x			Glass				
SO249-DR130 -6	1. Rock Type: volcanic, dacite massive pumice 2. Size: 25x26x18 cm 9. Encrustations: brownish, yellow-greyish films on surface 10. Comment: large block and it could be demo, all other descriptions as for -1 to -5						1 - 5	demo	
SO249-DR130 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

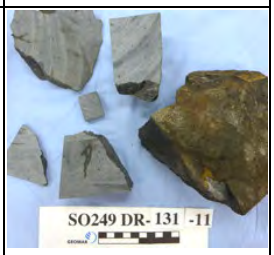
SO249-DR131
Piip volcano - top area, upper northeastern slope of southern cone
Dredge on bottom UTC 30/07/16 06:30hrs, lat 55°23.06'N, long 167°16.27'E, depth 712 m
Dredge off bottom UTC 30/07/16 07:16hrs, lat 55°22.89'N, long 167°15.94'E, depth 537 m
total volume: full
Comments:
several large solid rocks, lots of pumice, dropstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR131-1	1. Rock Type: volcanic. dacite pumice 2. Size: 8x14x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: white - greyish 5. Texture / Vesicularity: massive, vesicular, ~15% large intermediate and small vesicles 6. Phenocrysts: aphyric 7. Matrix: some glass inside vesicules 9. Encrustations: brown oxidation on edge layers 10. Comment: similar to dacite of DR130	x	x					TS in Airfreightbox	
SO249-DR131-2	1. Rock Type: volcanic, dacite pumice 2. Size: 10x12x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: white - creme 5. Texture / Vesicularity: more massive, dense and less vesicular (no large vesicles) than -1 6. Phenocrysts: rare Opx-Hbl-Plg phyric <1% 7. Matrix: crystallized 9. Encrustations: some brownish films	x	x		Opx, Plg, Hbl		1		
SO249-DR131-3	1. Rock Type: volcanic, dacite pumice, similar to -2 2. Size: 10x14x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: white - cream - yellowish 6. Phenocrysts: rare CPx-OPx-Hbl phyric (~1%) 9. Encrustations: brownish films on surface				Cpx, Opx, Hbl		2	TS in Airfreightbox	
SO249-DR131-4	1. Rock Type: volcanic, dacite pumice, similar to -1 2. Size: 14x19x21 cm 3. Shape / Angularity: angular 4. Color of cut surface: white 5. Texture / Vesicularity: several types of vesicles like in -1, aphyric 9. Encrustations: brownish films on surface and inside large vesicles inside the sample						1		
SO249-DR131-5	1. Rock Type: volcanic, dacite pumice, alike -1 2. Size: 10 pieses ~6cm ø each 3. Shape / Angularity: angular, some subangular 5. Texture / Vesicularity: aphyric, vesicular type						1		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR131-6	1. Rock Type: volcanic, andesite, porphyric 2. Size: 5x20x40 cm 3. Shape / Angularity: angular, platy 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, strongly porphyric 6. Phenocrysts: Plg ~20% up to 1.5cm, zoned crystals, Hbl ~7%, subordinate to Plg, up to 0.5cm 7. Matrix: finely crystallyzed grey matrix with Hbl microlites 9. Encrustations: brownish films on surface 10. Comment: good for dating could be well crystallized type of Hbl-Pl andesites of Piip (?)	x	x	1	Plg, Amph			TS in Airfreightbox	
SO249-DR131-7	1. Rock Type: volcanic, (meta)andesite, strongly porphyric 2. Size: 7x10x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, strongly porphyric 6. Phenocrysts: same set as -6 but partly altered, Plg reddish, Hbl mostly replaced with Act-Chl - greenish stuff 7. Matrix: altered, variolated with few zeolite "fans". Looks macroscopicaly like a sandstone 8. Secondary Minerals: Chl-Act, zeolite 10. Comment: altered type of -6	x	x		Plg, Hbl		6		
SO249-DR131-8	1. Rock Type: volcanic, porphyric dacite (?) 2. Size: 7x8x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: massive, vesicles (?) ~2-3% or because of crashing mafic minerals 6. Phenocrysts: Plg - (Fsp) up to ~1cm, zoning shadowed by secondary alteration (?) - clay minerals? or not altered, 10%, two generations, Qtz(?) transparent not altered ~3-5% two generations, Opx (?) - 1-2%(as subphenocrysts), Magnetite as subphenocrysts 7. Matrix: reddish due to alteration 8. Secondary Minerals: Act-Chl after Hbl (?) (Opx). Silicification after matrix? 10. Comment: subaeral eruption (?) reddish alteration, was badly cutted (sawed). Silicification, Qtz. Or could be well crystallized type of dacite Piip (?). Very likely dropstone though andesite	x	x		Plg, Fsp, Qtz, OPx				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR131-9	1. Rock Type: volcanic, subaphyric, moderately altered andesite (?) 2. Size: 20x26x3 cm, from Block R 3. Shape / Angularity: subangular 4. Color of cut surface: grey - brownish 5. Texture / Vesicularity: massive 6. Phenocrysts: no phenocrysts, only subphenocrysts. subphenocrysts: Plg ~20-30% up to 0.5cm, Amph ~10% up to 0.5cm elongated dark crystals 7. Matrix: fine grained, brownish, altered (?) 8. Secondary Minerals: Chlorite in voids, smectites in groundmass 9. Encrustations: thin oxidation, Mn oxide on surface 10. Comment: this rock looks similar to subalkalic basaltic andesites on Bering Island (table mounts above Nikolskoe Village) and interpreted as likely dropstone. overall good for GC. Ar/Ar possible on Amph ±Plg. Part of this sample taken in archive. Sample SO249-DR131-15x (in two bags).	x	x	2-3	Plg, Amph?, CPx?				
SO249-DR131-10	1. Rock Type: volcanic, Plg-Amph-(Px) andesite (basalt?) 2. Size: 15x10x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark greenish-grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: Amph ~5-7%, small ≤0.5 mm, prismatic crystalls, Plg ~10%, up to 3-4 mm (rare) mostly 0.5 mm 7. Matrix: fine-grained, partly chloritized 8. Secondary Minerals: chloritization on ground mass, Plg, Amph 9. Encrustations: thin film of Mn oxide on surface 10. Comment: this sample looks somewhat similar to -9. Significant alteration, subrounded shape and atypical petrography indicate likely dropstone origin, possibly from neighbouring Bering island	x	x	?	Amph, Pl				
SO249-DR131-11	1. Rock Type: volcanic, Amph-Px-Plg phyric andesite(?), moderately altered 2. Size: 29x16x11 cm, part of a block N (29x16x11) 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: CPx ~5-7%, ≤2mm, dark-green; Plg ~10%, ≤2 mm; Amph (?) ~ 5%, dark-green 7. Matrix: medium-grained, well-crystallized 8. Secondary Minerals: some chloritization 9. Encrustations: thin Mn film on surface 10. Comment: moderately altered but overall good for chemistry. This rock is unlike any other rock in dredge and interpreted to be most likely a dropstone	x	x	?	CPx, Amph (?)			TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR131-12	1. Rock Type: volcanic, Ol-Plg phyric vesicular basalt, moderately to strongly altered 2. Size: 14x10x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey with b/w spots 5. Texture / Vesicularity: vesicular ~5%, ≤1mm 6. Phenocrysts: Ol (altered) ~10% ≤4 mm, Plg ~20-30%, ≤2 mm 7. Matrix: fine-grained 8. Secondary Minerals: chloritization after Ol, smectites in vesicles 9. Encrustations: clay on surface, very minor Mn 10. Comment: altered strongly porphyric basalt. The only rock of this type in dredge. Very likely a dropstone	x	x	?	Ol (altered), matrix glass				
SO249-DR131-13	1. Rock Type: volcanic, Ol-Px phyric basalt, moderately to strongly altered 2. Size: 14x10x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-greenish grey 5. Texture / Vesicularity: porphyric, rare vesicles filled with white stuff 6. Phenocrysts: Ol ~15-20%, ≤2mm, altered, CPx ~15-20%, ≤2 mm, fresh 7. Matrix: fine-grained 8. Secondary Minerals: chloritization, likely albitization of groundmass, white fillings in voids 9. Encrustations: clay and minor Mn on surface 10. Comment: altered Ol-CPx basalt of possible island-arc provenance. Very likely a dropstone	x	x		CPx				
SO249-DR131-14	1. Rock Type: volcanic, subaphyric Hbl-Opx-(CPx) andesite with xenolith, fresh 2. Size: 19x12x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light-grey with black spots 5. Texture / Vesicularity: massive 6. Phenocrysts: Amph ~10%, ≤3mm, black; Opx ≤5%, ≤1mm, light green; CPx ≤1%, ≤1 mm, dark green 7. Matrix: fine-grained, xenolith of fine crystallized volcanic rock (?) dark grey with red spots 10. Comment: very fresh Hbl-Opx (Plg-free!) andesite of appearance typical for Western Aleutians adakites (W.Cones, Ingenstrem). Fresh, no Mn film indicates recent deposition of ocean floor. This rock is very good for GC. The only sample of this type in dredge. Very likely a dropstone of local provenance. Alternatively it can be a dike cropping out on Piip	x	x + 1x Natalie Gorbach	1	Hbl, CPx			TS in Airfreightbox	
SO249-DR131-15X	1. Rock Type: not defined 2. Size: 3. Shape / Angularity: 4. Color of cut surface: 5. Texture / Vesicularity: 6. Phenocrysts: 7. Matrix: 8. Secondary Minerals: 9. Encrustations: 10. Comment: Extra sample of sample -9								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR131 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR132

Volcanologist Massif - Southern slope of small cone located on the edge of the steep southern flank of Volcanologist Massif (S. of Piip)

Dredge on bottom UTC 30/07/16 10:37hrs, lat 55°17.04'N, long 167°18.03'E, depth 3036 m

Dredge off bottom UTC 30/07/16 11:51hrs, lat 55°17.39'N, long 167°17.98'E, depth 2607 m

total volume: 1/5 full, pillow lavas (+ few dropstones). Highly vesicular pillow lavas with many glassy margins

Comments: A relatively homogeneous dredge of Ol-phyric basalts with glassy margins. Sample-1 is Ol-CPx basalt, rounded, without glass and likely an "alien", coming from other cone. Sample -7 - andesitic breccia is likely dropstone. It was taken because of similarity to typical W .Aleutian adakites (Hbl+Opx phenocrysts)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR132-1	1. Rock Type: volcanic, pillow-lava, Ol-CPx basalt 2. Size: 22x14x9 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: vesicular, <15% 6. Phenocrysts: Ol (10%), CPx (15%), subphenocrysts: Ol, CPx ≤0.5 mm (max up to 1.5 mm) 7. Matrix: vesicular, fine-grained 8. Secondary Minerals: fresh 9. Encrustations: none 10. Comment: this rock represents Ol-CPx basalt (pillow-lava). Vesicularity is relatively low, fresh, good for GC. Ar/Ar on groundmass	x	x	2-3 grms	Ol, CPx			TS in Airfreightbox	
SO249-DR132-2	1. Rock Type: pillow-lava, Ol basalt 2. Size: 22x11x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to dark-grey/brownish 5. Texture / Vesicularity: porphyric, vesicularity (heterogeneous) from tiny in groundmass to large in other parts of the sample (<30%), 1-8 mm 6. Phenocrysts: porphyric, Ol (<10%), < 2mm 7. Matrix: fine-grained, < 30% vesicularity 8. Secondary Minerals: fresh 9. Encrustations: thin clay film 10. Comment: this rock represents Ol-basalt, pillow-lava, highly vesicular, with vesicular groundmass. In contrast to -1 this rock does not contain CPx. Ar/Ar is probably possible on groundmass	x	x	2-3	Ol		X	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR132-3	1. Rock Type: pillow-lava, Ol-basalt 2. Size: 17x13x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 5. Texture / Vesicularity: vesicular up to 30%, vesicles are from very small in the groundmass to large up to 1.5 cm similar to -2 but slightly less vesicularity in groundmass 6. Phenocrysts: as in -2 7. Matrix: fine grained 8. Secondary Minerals: fresh 9. Encrustations: thin clay film, thin Mn crust 10. Comment: this rock is very similar to -2. Ol basalt, vesicularity is high, large vesicles. Fresh basalt, very good for petrography.	x + 1x for Oleg S.	x?		Ol		#2	TS in Airfreightbox	
SO249-DR132-4	1. Rock Type: Ol-basalt, pillow, similar to -2 2. Size: 17x17x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 5. Texture / Vesicularity: as in -2 6. Phenocrysts: as in -2 7. Matrix: as in -2 8. Secondary Minerals: as in -2 9. Encrustations: as in -2 10. Comment: this rock is similar to -2 but contains glassy chilled margins - glass sample!, good for GC (fresh). Glass bag + 1 (Oleg S.)	x	x		Ol, Glass		#2		
SO249-DR132-5	1. Rock Type: Ol basalt, pillow, highly vesiculated 2. Size: 17x14x10 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: dark-grey and light grey layering 5. Texture / Vesicularity: highly vesiculated (< 30%). Dark-grey part contains larger vesicles (up to 4-5 mm), typically between 1-2 mm. Light-grey layers contain small vesicles, typically < 1mm (vesicularity ~ 25%). Light-grey layers are located close to chilled margin and have thickness of about 2 cm 6. Phenocrysts: Ol porphyritic (< 5%, < 2 mm, preserved) 7. Matrix: fine-grained, vesiculated 8. Secondary Minerals: almost fresh, some vesicles contain secondary minerals 9. Encrustations: chilled glassy margin, thin clay + Mn crust 10. Comment: This Ol-basalt is very similar to -2 but more vesiculated and contains two different layers: dark-grey (with larger vesicles) and light-grey with smaller vesicles. Glass bag + 1 for Oleg S.	x + 1x for Oleg S.			Ol, Glass				
SO249-DR132-6	1. Rock Type: volcanic: Ol-basalt, pillow 2. Size: 16x14x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey to brownish-grey 5. Texture / Vesicularity: highly vesiculated (heterogeneous distribution) < 30% up to 5 mm 6. Phenocrysts: Ol < 2% <1mm, fresh 7. Matrix: fine-grained, vesiculated, fresh 8. Secondary Minerals: fresh, some alteration along the rims 9. Encrustations: clay + Mn crust, very thin 10. Comment: this sampe is similar to -2 but more vesicular and contains chilled glassy margins. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR132-7	1. Rock Type: volcanic: Ol basalt, pillow 2. Size: 14x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey - very similar to -2 but less Ol phenocrysts (<1%) and highly vesiculated < 30% 10. Comment: this Ol-basalt is very similar to -2 but more vesicular and contains less phenocrysts. Glassy margin. Glass 1 + 1 for Oleg S.	x + 1x for Oleg S.			Ol, Glass		#2		
SO249-DR132-8	1. Rock Type: basalt, pillow 2. Size: 8x8x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey to light-grey layers - similar to -5 but very few Ol phenocrysts. 10. Comment: this sample is similar to -2 and -5 and is taken for glassy margins. Glass 1 + 1 for Oleg S.				Ol, Glass		#5, #2		
SO249-DR132-9	1. Rock Type: volcanic: basalt, pillow similar to -2 2. Size: part of block N, 26x22x19 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to yellowish-grey at the rims 10. Comment: this sample is similar to -2, slightly more altered at the rims; chilled glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		
SO249-DR132-10	1. Rock Type: basalt similar to -2 2. Size: 13x11x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 10. Comment: this sample is similar to -2 and it is taken for glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		
SO249-DR132-11	1. Rock Type: basalt, pillow lava, same as -2 2. Size: 12x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey, light-grey 10. Comment: this sample is similar to -2. Chilled glassy margin. Glass 1 + 1 for Oleg S.	x			Ol, Glass		#2		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR132-12	1. Rock Type: volcanic: basalt, pillow, similar to -2 2. Size: 9x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 10. Comment: this sample is similar to -2 and is taken for glassy margin. Glass 1 + 1 for Oleg S.	x + 1x for Oleg S.			Ol, Glass		#2		
SO249-DR132-13	1. Rock Type: volcanic: basalt, pillow, similar to -2 2. Size: 14x10x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 10. Comment: this sample is similar to -2 but contains more homogeneously distributed vesicles. Glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		
SO249-DR132-14	1. Rock Type: basalt, pillow 2. Size: 10x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 10. Comment: this sample is similar to -2 and is taken for glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		
SO249-DR132-15	1. Rock Type: volcanic, basalt, pillow, similar to -2 2. Size: 7x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 10. Comment: this rock is similar to -2 and is taken for glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		
SO249-DR132-16	1. Rock Type: volcanic: basalt, pillow, similar to -2 2. Size: 9x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 10. Comment: this sample is similar to -2 and is taken for glassy margin. Glass 1 + 1 for Oleg S.				Ol, Glass		#2		

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR132-17	1. Rock Type: volcanoclastic breccia with large andesitic clast 2. Size: 16x11x23 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey to reddish-grey to greenish-grey 5. Texture / Vesicularity: all rock: masive, clastic; andesite clasts. andesite = massive, porphyric 6. Phenocrysts: Andesite: Amph ~7%, ≤3mm; OPx ~5-7% (up to 10%), ≤ 1mm 7. Matrix: coarse-grained, leucocratic 8. Secondary Minerals: some chloritization on Plg in matrix, veins filled with white material 9. Encrustations: thin Mn and clay on surface 10. Comment: petrographically this andesite resembles adakites: Plg-free, Amph-Hbl phyric rocks. Because of subrounded shape and exotic type this rock is probably drop-stone of local provenance	x	x	1	Amph, Opx				
SO249-DR132 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR133

Volcanologists Massif. Southern edge of the basement

Dredge on bottom UTC 30/07/16 15:07hrs, lat 55°15.18'N, long 167°20.12'E, depth 3782 m

Dredge off bottom UTC 30/07/16 16:40hrs, lat 55°15.45'N, long 167°20.81'E, depth 3271 m

total volume: full

Comments:

Numerous fragments of pillow lavas, collumnar lavas, hyaloclastites.

The dreging has been done at the southern slope of Volcanologists Massif basement. The dredge was full of volcanic material represented by ±Cpx (±Ol; +- Pl) basalts. The basalts were from pillow lavas, collumnar lavas and contained hyaloclastites. Many rock pieces and blocks were with chilled glass margins. The encrustations and clay ± Mn-crust were relatively minor. The rocks are fairly fresh. The basalts are variably vesiculated from almost massive (minor or negligible vesicularity to highly vesicular (≤30%). There was one large block of silty maudstone rock. Most of basaltic samples represent Plg-Cpx porphyritic to almost aphyric basalts (1, 4, 5, 8, 9, 10, 12, 13). Several samples contain Ol and represent rocks with or without Pl and Cpx. Samples -5, 12, 16, 17, 21-25, 27, 28 contain glass.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-1	1. Rock Type: Plg-CPx basalt, pillow 2. Size: 12x17x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, vesicular (<5%, 1-10 mm, typically 1-2 mm) 6. Phenocrysts: CPx (<5%) 1-3 mm long; Plg (<1%) < 1mm 7. Matrix: fine-grained, vesiculated (< 15%) 8. Secondary Minerals: fresh with some alteration (blue, red, yellow) inside bubbles 9. Encrustations: very thin Mn-crust 10. Comment: this rock represents Plg-CPx-basalt (pillow lava). Porphyritic texture, vesicularity < 15%; groundmass is fine-grained, vesiculated. Fresh, good for GC	x	x		Plg, CPx		x		
SO249-DR133-2	1. Rock Type: volcanic, CPx-basalt, pillow 2. Size: 13x11x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic, vesicular (<10%). Vesicles range in size from 0.5 to 8 mm. Some of them are elongated 6. Phenocrysts: CPx (<5%) 1-5 mm, typically 2-3 mm 7. Matrix: fine-grained, partly vesiculated groundmass 8. Secondary Minerals: fresh rock 9. Encrustations: thin clay crust 10. Comment: this rock represents porphyritic CPx-basalt from pillow lavas. Vesiculated, with fine-grained groundmass. Fesh and very good for GC.	x	x		CPx				
SO249-DR133-3	1. Rock Type: Volcanic, Plg-Ol-CPx-basalt 2. Size: 9x8x12 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish-grey 5. Texture / Vesicularity: Porphyritic, vesicular. Vescularity <15%, 0.5-10 mm. Typically 2-3 mm. Large vesicles are elongated in the same direction 6. Phenocrysts: Plg (<1%) < 2 mm; Ol (<1%) < 1mm; Cpx (<1%) < 2mm, Well preserved 7. Matrix: fine-grained, vesiculated 8. Secondary Minerals: fairly fresh 9. Encrustations: thin clay and Mn-crust 10. Comment: this rock represents Plg-Ol-CPx-basalt, vesiculated, very fresh, good for GC	x	x		Plg, Ol, CPx		x		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-4	1. Rock Type: Volcanic, CPx-Plg basalt 2. Size: 18x7x12 cm 3. Shape / Angularity: subangular to subrounded 4. Color of cut surface: grey to yellowish-grey 5. Texture / Vesicularity: porphyritic, vesicular (<1%, up to 5 mm, elongated, typicall size <1mm) 6. Phenocrysts: CPx <1%, <1mm; Plg <3%, up to 10 mm, typically 2-4 mm. Well-preserved 7. Matrix: fine-grained vesicular groundmass 8. Secondary Minerals: relatively fresh but vesiches filled with secondary yellowish minerals 9. Encrustations: almost no encrustations, very thin clay crust 10. Comment: this sample represents CPx-Plg basalt with low vesicularity. Fairly fresh but some alteration within vesicles and along cracks	x	x		Cpx, Plg				
SO249-DR133-5	1. Rock Type: volcanic: rare Cx-Plg basalt, fresh pillow fragment 2. Size: 19x12x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: vesicular, slightly porphyritic 6. Phenocrysts: CPx (≤1%, <0.5 mm), Plg (≤1%, <1 mm) 7. Matrix: fine-grained, strongly porphyric (~20-25%, ø 1-1.5 mm) 8. Secondary Minerals: some clay in vesicles 9. Encrustations: clay and Mn outer film, filling in cracks 10. Comment: nearly aphyric Px-Plg basalt, limited use for GC due to abundant vesicles filled with clay, contains fresh glass	x	x		CPx, Plg, Glass				
SO249-DR133-6	1. Rock Type: volcanic, Ol-Plg basalt columnar fragment; moderately altered 2. Size: 20x12x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey with white spots 5. Texture / Vesicularity: porphyritic, massive, no vesicles 6. Phenocrysts: Plg (~5% large up to 6 mm), Ol (~3-5%, small <0.5mm) 7. Matrix: fine grained, well crystallized, intersertial 8. Secondary Minerals: Ol altered to serpentine and Fe oxide; some oxidation in groundmas, otherwise appears fresh 9. Encrustations: oxidation and clay on outer surface 10. Comment: Ol-Plg basalt; columnar fragment, reasonable fresh for Ar/Ar ---> Plg	x	x	Plg	Plg, Ol (alt.)		X		
SO249-DR133-7	1. Rock Type: volcanic, Px-Ol-Plg phyric basalt, fresh 2. Size: 18x11x16 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: vesicular, rare porphyric 10. Comment: similar to sample -3, good for GC, clay in vesicules should be avoided	x	x		Ol, Px, Plg		3		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-8	1. Rock Type: volcanic: rare Px-Plg basalt, fresh 2. Size: 20x22x15 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyric, vesicular (~20-30%; large up to 3 mm along and abundant vesicles small <0.5 mm) 6. Phenocrysts: Plg: ~5% up to 0.7 cm; CPx: 2-3% <1 mm dark green 7. Matrix: fine crystallized 8. Secondary Minerals: some oxidation, clay fillings 9. Encrustations: thin film / precipitates on outer surface, some clay in vesicles 10. Comment: rare Px-Plg basalt, vesicular, quite fresh and good for GC, Ar/Ar possible on Plg	x	x	1	Plg, Px		x		
SO249-DR133-9	1. Rock Type: volcanic, rare Px-Plg basalt, quite fresh 2. Size: 25x13x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey to dark grey 5. Texture / Vesicularity: porphyric: vesicular (15-20%) large up to 2 cm elongated and abundant small vesicles <0.5 cm ronded) 6. Phenocrysts: Plg 3-5% up to 0.5 cm, forms clusters; Px: rare ~1-2 %, dark green, <1 mm 7. Matrix: fine crystallized, may content glass 8. Secondary Minerals: some oxidation; clay fillings in vesicles (yellow) 9. Encrustations: as in -8 10. Comment: rare Px-Plg basalt, vesicular, pretty fresh and good for GC, may be used for Ar/Ar (Plg)	x		1 (Plg, glass(?))	Plg, Px		8		
SO249-DR133-10	1. Rock Type: volcanic, Px-Plg basalt, moderately altered 2. Size: 15x16x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey with white and orange dots 5. Texture / Vesicularity: massive with rare vesicles and some cracks with alteration. Vesicles are located near the surface. Small (up to 3mm) and rounded 6. Phenocrysts: Px 1-2%, altered to yellow with some green cores; Plg ~10% up to 0.5-0.7 cm. May be altered surface with some black spots 7. Matrix: fine grained; strongly porphyric (10-15%) 8. Secondary Minerals: alteration in vesicles; cracks and groundmass (orange and greenish spots), may be oxidized 9. Encrustations: clay and thin Mn crust; filling in cracks 10. Comment: moderatly altered Px-Plg basalt, no good for GC and dating	x	x		Px (alt), Plg				

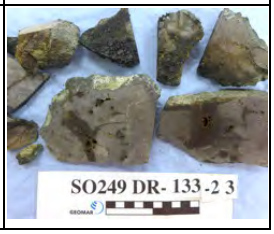
Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-11	1. Rock Type: volcanic, rare Ol-Plg basalt, fresh 2. Size: 18x13x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to grey 5. Texture / Vesicularity: vesicular (up to 20%) big ones up to 2 cm (<5 %) and small rounded up to 0.3 cm (15-20%) 6. Phenocrysts: Ol - small grains ~1mm (<1%) yellow, may be sligthly altered; Plg - <2%, up to 2mm 7. Matrix: Fine grained, may contain some glass 8. Secondary Minerals: some clay in vesicles, maybe some alteration of Ol 9. Encrustations: clay and Mn thin, glassy crust (up to 5 mm thick) 10. Comment: fairly fresh, subaphyric Ol-Plg basalt, porous with good glassy crust, good for GC and dating	x	x	Glass	Ol?, Plag				
SO249-DR133-12	1. Rock Type: volcanic, Px-Plg basalt, altered, looks similar to -10 2. Size: 15x15x9 cm 6. Phenocrysts: Px up to 2 mm, <3%, altered fine green cores (oxidized). Plg up to 1 cm ~5-7% 7. Matrix: well crystallized, fine grained, porphyritic 8. Secondary Minerals: altered Px crystals, a lot of orange-brown areas (oxidation) 9. Encrustations: clay and thin Mn crust; up to 5 mm glass crust (may be altered) 10. Comment: moderatly altered Px-Plg basalt with glass crust	x	x		Gl, Px, Plg				
SO249-DR133-13	1. Rock Type: volcanic, Px bearing basalt, moderately altered 2. Size:22x25x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey with brownish dots 5. Texture / Vesicularity: vesicular, sligthly porphyritic, vesicles of two types - up to 0.7 mm filled with grey mineral; ~small, rounded up to 0.1 mm open (~30%) 6. Phenocrysts: Px - <1 %, light green up to 2 mm; Plg 4-5 % up to 0.5 cm 7. Matrix: cryptocrystallized with high amount of micropores (~40-50%) and Plg microlithes. 8. Secondary Minerals: oxidized spots abundant 9. Encrustations: clay and Mn crust film 10. Comment: Px- bearing Plg-phyric basalt sligthly porous with ligth oxydation, good for GC and dating	x	x	Plag (?)					
SO249-DR133-14	1. Rock Type: Volcanic, rare Ol-Plg basalt, fairly fresh 2. Size: 24x22x15 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light grey 5. Texture / Vesicularity: aphyric with rare phenocrysts of Ol and Plg (<1-2%) 6. Phenocrysts: Ol - light yellow to greenish up to 1-2 mm < 1 % 7. Matrix: fine grained, vesicular (vesicles form separate layers with different vesicle size) 8. Secondary Minerals: some clay in cracks 9. Encrustations: clay and oxidized outer surface 10. Comment: aphyric Ol-Plg basalt with layered vesicle texture, quite fresh, good for GC	x	x		Ol, Plg				

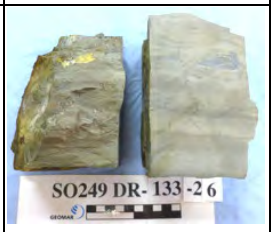
Appendix 2 (Leg2 Station Details and Rock Description)

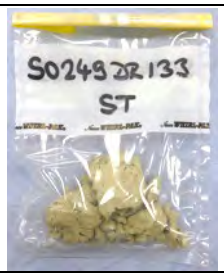
SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-15	1. Rock Type: volcanic, rarely Ol-Plg basalt, slightly altered 2. Size: 15x10x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey with white and brownish dots 5. Texture / Vesicularity: vesicular (7-10%). Vesicles are small up to 0.3-0.4 cm, apyric with rare Ol and Plg crystals 6. Phenocrysts: Ol - <1%, up to 1 mm (yellow to light greenish); Plg - 1-2%, up to 2 mm 7. Matrix: fine crystallized, with a lot of microvesicles (0.1 mm) 8. Secondary Minerals: oxidation, clay in vesiules 9. Encrustations: very thin clay and Mn outer film 10. Comment: good for GC								
SO249-DR133-16	1. Rock Type: volcanic, Ol-Opx-Plg basalt, moderately altered 2. Size: 14x10x7 cm 3. Shape / Angularity: angular, typical sector fragment of pillow 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric with some vesicles (<5-10%) 6. Phenocrysts: Ol or Opx with some glassy (1-2%); Plg - up to 1 cm (rare), typically - 0,5 cm (<7%) 7. Matrix: fine grained, brownish-dark grey with spots 8. Secondary Minerals: glass rim and matrix altered, some clay in vesicles 9. Encrustations: clay and oxidation on outer surface 10. Comment: nice fragment of sectoral pillow lava with some glass crust, some big Plg crystals. Could be used for Ar/Ar (Plg?)	x			Plg, Gl				
SO249-DR133-17	1. Rock Type: volcanic, Plg-phyric basalt, sligthly altered 2. Size: 20x10x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with brownish areas 5. Texture / Vesicularity: Plg-phyric, vesicular (up to 1 cm, typically - 0, 3 cm; <15%-20%) 6. Phenocrysts: Plg - up to 0.5 cm; < 5% 7. Matrix: fine grained, vesicular 8. Secondary Minerals: some oxidition, clay in vesicles 9. Encrustations: clay and Mn film on outter surface 10. Comment: slightly altered Plg phyric basalt	x			Plg, Gl				
SO249-DR133-18	1. Rock Type: volcanic, Plg basalt 2. Size: 19x13x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: similar with to -17, but less phenocryts. 7. Matrix: fine grained, massive, vesicles less than 5 %: 10. Comment: Plg bearing basalt with massive texture, quite altered	x			Plg				
SO249-DR133-19	1. Rock Type: volcanic, Plg phyric basalt 2. Size: 18x10x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: similar to -17 and -18 but more massive / dense (vesicles less than 1%) 10. Comment: Plg phyric basalt, massive, quite altered	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-20	1. Rock Type: volcanic, rare Ol-Plg basalt 2. Size: 13x10x9 cm 3. Shape / Angularity: similar to -14 10. Comment: Ol-Plg bearing basalt with elongated vesicules, fairly fresh, good for GC	x	x		Ol, Plg				
SO249-DR133-21	1. Rock Type: volcanic, small pillow lava fragment with thick glass crust (up to 3 cm), aphyric basalt 2. Size: 15x5x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey to brownish basalt with black glassy crust 5. Texture / Vesicularity: dense core with some small rounded vesicles at the rim and cracky glass crust 6. Phenocrysts: rare Plg phenocrysts (up to 2-3 mm, < 1%) 7. Matrix: cryptocrystallized matrix, vesicular outter rim 8. Secondary Minerals: clay in cracks and brown color of core 9. Encrustations: very thick glass crust with clay filling and some Mn minerals 10. Comment: very nice block of small pillow lava of aphyric basalt with very thick glass crust				Gl				
SO249-DR133-22	1. Rock Type: volcanic, pillow lava fragment, Plg-Ol phyric basalt 2. Size: 23x9x12 cm 3. Shape / Angularity: angular, typical form of pillow fragment 4. Color of cut surface: dark grey with white spot. Black glass crust with brownish areas 5. Texture / Vesicularity: porphyric with big vesicles or vesicules clusters (along cracks) 6. Phenocrysts: Plg - up to 0.5-0.7 cm, < 3-5 %; Ol - up to 0.2 cm a lot of fragments are in the glassy crust 7. Matrix: very fine crystallized 8. Secondary Minerals: oxydized spots, clay in vesicules and cracks (yellowish and greenish) 9. Encrustations: thin clay and greenish film. thick glass crust 10. Comment: sligtly altered fragment of pillow lava, Plg phyric basalt wit thick glass crust, contains Ol in glass crust	1			Gl, Plg, Ol				
SO249-DR133-23	1. Rock Type: volcanic, hyaloclastite + pillow fragment 2. Size: 23x13x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: similar to -22 does not contain Ol 10. Comment: good sample for glass separation	x			Gl				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-24	1. Rock Type: volcanic, Plg-Ol phyric basalt, quite fresh with glass crust 2. Size: 9x6x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: ligth grey 5. Texture / Vesicularity: massive, porphyritic (<5%) 6. Phenocrysts: Plg up to 1 cm (<3%), Ol - ligth greenish- yellow, up to 2-3 mm, ~2% 7. Matrix: fine crystallized 8. Secondary Minerals: some clay in cracks and rare vesicles 9. Encrustations: thin clay film on the outer surface and glass crust up to 3 mm 10. Comment: good sample to GC and dating, contain fresh glass, porphyritic Ol-Plg basalt				Gl				
SO249-DR133-25	1. Rock Type: volcanic, Ol-Plg phyric basalt 2. Size: 25x10x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey with brownish areas at big vesicles 5. Texture / Vesicularity: vesicular up to 15% and 1 cm in size 6. Phenocrysts: Plg <5% ,<0.5-0.7 cm; Ol < 2%, < 0.2 cm 7. Matrix: vesicular, crypto-crystallized 8. Secondary Minerals: oxydized areas, sligthly altered matrix, clay in vesicles 9. Encrustations: thin clay and oxydized film on outer surface 10. Comment: porous Ol-Plg phyric basalt sligthly altered, contains glassy crust up to 0.5 cm	x			GL				
SO249-DR133-26	1. Rock Type: sedimentary, silty mudstone, turbidite (?) 2. Size: 59x47x30 cm 3. Shape / Angularity: fragment of block U 4. Color of cut surface: pale grey to greenish grey with layered lense like structure 5. Texture / Vesicularity: solidified 7. Matrix: sedimentary with thin Mn crust	x	x						
SO249-DR133-27	1. Rock Type: volcanic, CPx- Plg basalt, altered 2. Size: 35x30x25 cm, part of block R 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric, vesicular (<5-7%), vesicles not rounded 6. Phenocrysts: CPx - up to 2-3 mm, 3%; Plg - up to 5 mm, 5 % 7. Matrix: vesicular up to 35%, small rounded, usually 1-2 mm 8. Secondary Minerals: brownish color of groundmass, clay in big vesicles 9. Encrustations: thin clay and Mn film, glass crust 10. Comment: big block of CPx-Plg basalt with some glass crust	x	x		Gl				

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR133-28	1. Rock Type: volcanic, aphyric basalt 2. Size: 29x25x25 cm 3. Shape / Angularity: angular 4. Color of cut surface: ligth grey 5. Texture / Vesicularity: vesicular (up to 2 cm, < 15 %). Some elongation of the vesicules 6. Phenocrysts: rare Plg (<1%, < 2 mm) 7. Matrix: Vesicular (up to 1-2 mm, ~10 %) 8. Secondary Minerals: clay in vesicles and veins, cracks 9. Encrustations: thin clay crust and maybe 3-5 mm glass crust (altered) 10. Comment: big bock of aphyric basalt with some glass encrustation, sligthly altered, pretty good for GC	x	x		Gl, Plag				
SO249-DR133 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR134
Komandorsky Block - south eastern tip of the base of Medny Island, upper NE-facing slope
Dredge on bottom UTC 131/07/16 09:39hrs, lat 54°20.86'N, long 168°41.208'E, depth 1645 m
Dredge off bottom UTC 13/07/16 10:42hrs, lat 54°20.58'N, long 168°40.99'E, depth 1220 m
total volume: 1/2 full
Comments: Volcanic rocks, mostly subrounded, larger and smaller blocks; aphyric to Plg-phyric andesites, some andesitic breccias

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR134-1	1. Rock Type: volcanic, aphyric, Hbl-andesite 2. Size: part of block U, 35x25x16 cm 3. Shape / Angularity: subangular - subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: rare Amph (up to 0.5cm), not usual black, greenish-blackish, similar in colour to groundmass; this is the first generation. Second generation are Hbl (alongated) ~5% blacky, partly replaced with bownish-bronze stuff. Fine subphenocrysts, microlites up to 2-3mm in length, rare Opx <1%, Plg in microlites 7. Matrix: fine-grained, grey relatively fresh (?), possibly some vesicles (1-3%) replaced with black stuff 9. Encrustations: ~1-2 cm of oxidized halo around sample, white veins inside of (opal) chalcedon and smaller parts carbonate 10. Comment: andesite? (Mg andesite)	x	x	Amph, GM (?)			x	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR134-2	1. Rock Type: volcanic, subaphyric, Plg-Amph-OPx andesite 2. Size: part of block R, 18x28x40 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: subphenocrysts of Plg (~20%) up to 2-3 mm, Hbl (~5%), rare Opx (~1%). Rare Amph phenocrysts up to 0.5 cm. Rare segregations of Plg + OPx up to 0.5 cm 7. Matrix: fine-grained, brownish, altered 9. Encrustations: ~0.5 cm of oxidized halo around sample, oxdation film is inside the sample	x	x					TS in Airfreightbox	
SO249-DR134-3	1. Rock Type: volcanic, aphyric andesite 2. Size: 12x12x16 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 7. Matrix: grey brownish, partly crystallized. Microliths of Plg (~30%) and Amph (~10%). Amph microlites are mostly (2/3) partially opaque, 1/3 - black. There are some segregations of small Amph up to 0.5 cm 9. Encrustations: ~1 cm alteration margin; grey. Whereas inner part is brownish grey (weathered before sea-water alteration)	x	x					TS in Airfreightbox	
SO249-DR134-4	1. Rock Type: volcanic, aphyric (rare porphyric) meta-andesite 2. Size: part of block Z, 13x18x27 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: red-brownish 5. Texture / Vesicularity: massive 6. Phenocrysts: rare Plg (~1%), black Hbl (less then 1%) with altered rim. In microlites: Plg (dominates), Amph, more rare than Opx 7. Matrix: fine-grained, red-brownish	x	x					TS in Airfreightbox	
SO249-DR134-5	1. Rock Type: volcanic, (rare) porphyric andesite, rather altered mush-mixed type 2. Size: part of block E, 12x20x28 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg (3-5%) and Hbl (~1%) up to 0.5 cm 7. Matrix: fine-grained, small vesicles are visible on wet surface. Probably there are also some vesicles in previuos samples. Some blocks are a little bit more porphyric or oxidized 8. Secondary Minerals: Hbl has an altered rim. Brownish groundmass is included in central part of Plg 9. Encrustations: there is a brownish film on the surfce. No halo	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR134-6	1. Rock Type: volcanic, Plg-porphyric andesite 2. Size: 12x15x19 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey-greenish (another part of the sample is grey-brownish) 5. Texture / Vesicularity: massive, there are small evenly distributed vesicles in GM (~35%) 6. Phenocrysts: Plg ~3-5% up to 0.7mm 7. Matrix: medium grained, Plg, Amph and Mt are in microlites. Greenish in colour (smectites ?) 8. Secondary Minerals: large Plg is also greenish, especially in the inner parts due to alteretion of included groundmass 9. Encrustations: yellow-brownish films 10. Comment: greenish style of alteration	x	x						
SO249-DR134-7	1. Rock Type: volcanic, Hbl-Plg porphyric andesite 2. Size: 10x13x16 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey-greenish 5. Texture / Vesicularity: massive, there are small vesicles (~2%) in GM filled with yellowish stuff 6. Phenocrysts: mainly Plg (~5%) up to 0.5 cm, subphenocrysts of Plg and Hbl 7. Matrix: groundmass is a "sandstone" type crystallized mass. The intersticium is greenish 9. Encrustations: greenish film is on the sample	x	x	Plg				TS in Airfreightbox	
SO249-DR134-8	1. Rock Type: volcanic, Plg-porphyric andesite 2. Size: 6x16x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg (~3%) 7. Matrix: crystallized, microlites, Plg, Amph, Mt 8. Secondary Minerals: greenish - due to smectite after glass (?). Brownish - due to oxidation of Amph and Mt 9. Encrustations: brownish-greenish spotty films on the sample	x	x				#6, 7		
SO249-DR134-9	1. Rock Type: volcanic, Plg-porphyric andesite 2. Size: 7x6x17 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-brownish 7. Matrix: Microlite: Plg, Mt, less Hbl than in -7 and -8	x	x				#7, 8		
SO249-DR134-10	1. Rock Type: volcanic, subaphyric, Plg-andesite 2. Size: 12x15x17 cm 3. Shape / Angularity: subangular, subrounded 4. Color of cut surface: grey-yellowish 5. Texture / Vesicularity: massive, "sandstone"-type of andeste 7. Matrix: subphenocrysts-microlites of Plg are abundant (up to 2 mm), Hbl microlites are rare 9. Encrustations: brownish-violettish film of oxidized spots on the surface. The sample has a net-type violettish drawing with the cells up to 1 cm. 10. Comment: Piece for GC also has such a net-type drawings of alteration	x	x					TS in Airfreightbox	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR134-11	1. Rock Type: volcanic: aphyric, "sandstone" type of andesite 2. Size: 7x9x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: massive 7. Matrix: evenly crystallized microlites, Plg (~15-20%) up to 2 mm, Opx (~3-4%), Amph (~1%). "Sandstone" type structure 10. Comment: a bit different from -10 as it has Opx in groundmass. Looks better for GC than -10, but we didn't cut GC	x						TS in Airfreightbox	
SO249-DR134-12	1. Rock Type: volcanic-volcanoclastic, aphyric to more porphyric andesite 2. Size: part of a block 13x17x23 cm 3. Shape / Angularity: subangular-subrounded 4. Color of cut surface: grey-greenish-yellowish 5. Texture / Vesicularity: massive, transitional to breccia-type 7. Matrix: mixing mush of slightly different andesite blocks from aphyric (Hbl-andesite) to Plg-andesite, and different extends of crystallization 9. Encrustations: brownish film on the surface 10. Comment: can be used for volcanoclastic demonstration	x							
SO249-DR134-13	1. Rock Type: volcanic, breccia of rare Plg-andesite 2. Size: 7x11x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-brownish 5. Texture / Vesicularity: massive, breccia 10. Comment: angular clasts of greenish and brownish rare Pl-andesite in aphyric andesite matrix, microlites pf Plg, Amph, Mt	x							
SO249-DR134 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR135

Guyot SE of Medny Island, N-facing slope

Dredge on bottom UTC 13/07/16 12:42hrs, lat 54°16.99'N, long 168°44.73'E, depth 882 m

Dredge off bottom UTC 13/07/16 14:10hrs, lat 54°16.55'N, long 168°44.58'E, depth 344 m

total volume: full

Comments: lava fragments of andesite and basaltic andesite dominate. They differ by feshness and amount of phenocrysts. Main types are 1) Amph-CPx phyric (sample -1,-8, -9, -10), 2) Amph-CPx phyric with minor Plg (sample -2 to -7) and highly Plg phyric with minor Amph (-11 through -13)

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR135-1	1. Rock Type: volcanic, andesite (?), light altered surface 2. Size: 15x18x27 cm, block X 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: CPx (~5-7%), Amph (>5%), Ol and Amph? replaced by secondary blue mineral, rare Plg 10. Comment: high-Mg andesite?	x	x					TS in Airfreightbox	
SO249-DR135-2	1. Rock Type: volcanic, andesite (?), low altered surface 2. Size: 17x9x11cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric (~10-12% phenocrysts) 6. Phenocrysts: Amph (~5%), Cpx (~3-4%), Plg, rare, but large phenocrysts up to 5mm 7. Matrix: fine grained matrix 10. Comment: the sample is similar to -1, but Plg phenocrysts are present	x	x					TS in Airfreightbox	
SO249-DR135-3	1. Rock Type: volcanic, light altered surface 2. Size: 9x7x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: phenocrysts, micro phenocrysts up to 15%, Amph (5-7%), Px (>3%), Plg (2-5%), Plg enriched zones 7. Matrix: fine grained 8. Secondary Minerals: 9. Encrustations: 10. Comment: this rock contains more Plg than -1 and -2	x	x						
SO249-DR135-4	1. Rock Type: volcanic, andesite (?), low altered surface 2. Size: 15x11x7 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric, massive, no vesicles 6. Phenocrysts: phenocrysts and microphenocrysts up to 15-20%, the small Amph grains replaced by blue secondary minerals, CPx ~3%, rare microphenocrysts of Plg 7. Matrix: fine grained matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: similar to -2	x	x						
SO249-DR135-5	1. Rock Type: volcanic, low altered surface 2. Size: 12x9x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric massive, no vesicles 6. Phenocrysts: phenocrysts + microphenocrysts (15-20%), Amph (~10%), CPx (~5%), rare Plg microphenocrysts 7. Matrix: 8. Secondary Minerals: 9. Encrustations: 10. Comment: this rock is more crystallized	x	x					TS in Airfreightbox	

SO249-DR135-6	1. Rock Type: volcanic, andesite (?), light altered surface 2. Size: 12x19x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyric massive 6. Phenocrysts: ~20% of phenocrysts mainly Amph, three groups of Amph phenocrysts by size 1) large grains (up to 10-15mm) rare group, 2) moderate size group (~5%) from 3-7mm partly replaced by secondary minerals and Mt, 3) small sze phenocrysts, dominate population of Amph (~5-7%), CPx and Plg are rare in this sample 7. Matrix: fine grained matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: high Mg# andesite, Amph enriched	x	x					TS in Airfreightbox	
SO249-DR135-7	1. Rock Type: volcanic, light altered surface 2. Size: 19x26x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: large phenocrysts of Amph (CPx??), almost entirely replaced by secondary minerals (~5%), microphenocrysts of Plg, Amph and CPx (~10%) 7. Matrix: fine grained matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: basaltic andesite?	x	x						
SO249-DR135-8	1. Rock Type: volcanic, basaltic andesite (?), altered surface 2. Size: 17x9x10 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: mainly microphenocrysts, large phenos are rare (~3-5%), replaced by yellow secondary minerals, microphenocrysts dominate Amph, Cpx in small amounts 7. Matrix: fine grained matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: more altered rock compared to previous, basaltic andesite?	x	x						
SO249-DR135-9	1. Rock Type: volcanic, slightly altered surface 2. Size: 28x15x18 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porhyric, slightly vesicular small isometric vesicles up to ~5-7%) 6. Phenocrysts: Amph and more rare CPx phenocrysts (5-7%) almost entirely replaced by yellow clay secondary minerals, Plg microphenocrysts up to 5% 7. Matrix: glassy matrix? 8. Secondary Minerals: 9. Encrustations: 10. Comment: basaltic andesite?	x	x					TS in Airfreightbox	

SO249-DR135-10	1. Rock Type: volcanic, basaltic andesite, low altered surface 2. Size: 21x14x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyric, slightly vesicular, small rounded vesicles up to 5-7% 6. Phenocrysts: Amph and CPx partly replaced by secondary minerals ~5-7%, Plg microphenocrysts ~5% 7. Matrix: glassy matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: this rock is identical to -9, basaltic andesite!	?	?						
SO249-DR135-11	1. Rock Type: volcanic, low altered surface 2. Size: 14x9x9 cm 3. Shape / Angularity: slightly rounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: total ~25-30%, Plg dominates (up to 15%), Amph and more rare Px partly replaced blue minerals 7. Matrix: fine grained matrix 8. Secondary Minerals: 9. Encrustations: 10. Comment: well-crystallized samples, dropstone??	x	x						
SO249-DR135-12	1. Rock Type: volcanic, andesite (?), slightly altered surface 2. Size: 13x9x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: total up to 35-40%, Plg dominates (~25%) in two generation by size, Amph (~5-10%) are fresh and also present in two populations 7. Matrix: glassy 8. Secondary Minerals: 9. Encrustations: 10. Comment: such rocks are present in previous dredge as single samples, dropstones?	x							
SO249-DR135-13	1. Rock Type: volcanic, andesite (?), altered brownish surface 2. Size: 13x6x7 cm 3. Shape / Angularity: rounded 4. Color of cut surface: pink-brownish 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: total ~25%, Amph (1-3mm) dominates (~15-20%), Cpx (~5%) and Plg are present in small amounts, Amph and Cpx partly replaced by yellow and green minerals 7. Matrix: fine grained 8. Secondary Minerals: 9. Encrustations: 10. Comment: this rock is similar to -1 through -4	x							
SO249-DR135 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR136
Komandorsky Block, central section of slope, SE of Bering Is., base of upper unit
Dredge on bottom UTC 31/07/16 21:49hrs, lat 54°20.71'N, long 166°47.73'E, depth 3866 m
Dredge off bottom UTC 31/07/16 23:29hrs, lat 54°21.22'N, long 166°47.69'E, depth 3350 m
total volume: 1/4 full
Comments: Sediments of two types: 1 -breccia (coarse grained and finegrained), 2- unsolidified clay-stone.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR136-1	1. Rock Type: sedimentary 2. Size: 10x9x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: yellowish-grey 5. Texture / Vesicularity: silty clay 7. Matrix: clay 9. Encrustations: none 10. Comment: sedimentary, clay-rich rock					x			
SO249-DR136-2	1. Rock Type: sedimentary breccia 2. Size: 20x12x13 cm 3. Shape / Angularity: rounded 4. Color of cut surface: yellowish-brown 5. Texture / Vesicularity: breccia 7. Matrix: clay 9. Encrustations: thin Mn-crust 10. Comment: sedimentary breccia with clasts of different sizes (up to 4cm, typically 2-5mm)					x			
SO249-DR136 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR137
Komandorsky Block, southern slope of Bering Island
Dredge on bottom UTC 01/08/16 04:13hrs, lat 54°08.12'N, long 167°05.97'E, depth 3998 m
Dredge off bottom UTC 01/08/16 05:31hrs, lat 54°08.25'N, long 167°06.27'E, depth 3591 m
total volume: few rocks
Comments: sediments

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR137-1	1. Rock Type: sedimentary, sandstone 2. Size: 10x6x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: greyish green with orange areas 7. Matrix: fine grained					x			

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR137 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR138
Komandorsky Block, southern slope of Komandorsky Block, steep scarp at the SW tip of basement nose
Dredge on bottom UTC 01/08/16 10:40hrs, lat 54°22.49'N, long 167°03.68'E, depth 1390 m
Dredge off bottom UTC 01/08/16 11:51hrs, lat 54°22.71'N, long 167°04.13'E, depth 1052 m
total volume: 1/3 full
Comments: sediments (silt, sandstone-breccia) and volcanic rocks (Cpx-phyric, aphyric and Opx-Hbl-Plg andesite, diorite)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR138-1	1. Rock Type: volcanic, (Ol)-Cpx-porphyric basalt 2. Size: 8x9x16 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey-greenish 5. Texture / Vesicularity: massive, possibly had some porphyric vesicles, but replaced with secondary black stuff 6. Phenocrysts: CPx p to 1.5cm, ~5% fresh up to green light Mg, Ol ~1% 7. Matrix: evenly crystallized coarse-grained "sandstone", light-greenish-greyish and black round vesicles(?) filled stuff, black rounded, sometimes crystal shaped, secondary (?) stuff (soft with neelde) 10. Comment: (Ol)-Cpx-porphyric basalt	x	x					TS in Airfreightbox	
SO249-DR138-2	1. Rock Type: volcanic, almost intrusive, (Hbl)-diorite 2. Size: 8x13x23 cm 3. Shape / Angularity: subrounded plate 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg ~85%, up to 1cm, Amph ~5%, subordinate, intersertial, Mt-(Sp) ~2-3%, Matrix ~7-10% 7. Matrix: altered, greenish stuff 9. Encrustations: brownish film on one side 10. Comment: (Hbl)-diorite	x	x					TS in Airfreightbox	
SO249-DR138-3	1. Rock Type: volcanic, aphyric lava 2. Size: part of block X, 8x13x22 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark-grey 5. Texture / Vesicularity: massive, no vesicles 6. Phenocrysts: none, rare Amph(?), if yes then altered, black but soft 7. Matrix: finely crystallized, small elongated crystals (Cpx?) Plg 9. Encrustations: brownish oxidation halo up to ~0.5-1cm around sample	x	x					TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR138-4	1. Rock Type: volcanic, OPx-Hbl-Plg andesite 2. Size: from block S, 24x20x16 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: yellowish-geensih 5. Texture / Vesicularity: massive, but not solid (easily broken) 6. Phenocrysts: Plg ~20% up to 0.5-0.7 mm, Hbl ~3-5%, OPx ~0.5-1% 7. Matrix: fresh, crystalized microlites of Plg, Amph, OPx 9. Encrustations: brownish film	x		Amph, Plg				TS in Airfreightbox	
SO249-DR138-5	1. Rock Type: sedimentary, volcanoclastic sandstone breccia 2. Size: 7x12x25 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey-greensih-brownish 5. Texture / Vesicularity: massive 7. Matrix: medium to coarse grained, some parts clastic 9. Encrustations: brownsh-dark brownish around beginning of Mn crust (?) 10. Comment: there is more such stuff present next dredge (DR139) in matrix, there are as individual grains of lag, altered (greenish) OPx, and also clasts, subangular-subrounded of vesicular a.dacite tuffs, brownish, some with Qtz crystals	x							
SO249-DR138-6	1. Rock Type: sedimentary, volcanogenic sandstone 2. Size: part of block R, 16x23x32 cm 3. Shape / Angularity: subangular, subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 7. Matrix: medium grained, individual grains <1mm (~30%), evenly disributed in small grains (rounded) of Plg matrix 9. Encrustations: brownish oxidation halo 0.5-1cm around sample	x							
SO249-DR138-7	1. Rock Type: sedimentary, volcanogenic sandstone 2. Size: 11x12x14 cm 3. Shape / Angularity: subrounded a ball-line 4. Color of cut surface: grey-brownish 5. Texture / Vesicularity: massive 7. Matrix: medium to fine grained 9. Encrustations: 1-2cm halo of oxidation (yellow-brownish) around almost all the sample	x							
SO249-DR138-8	1. Rock Type: sedimentary, siltstone 2. Size: 5x9x14 cm 3. Shape / Angularity: subangular plate 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive, some layering 7. Matrix: fine grained, but with 5-10% of mineral grains of medium size-similar to -7, some layers of pure-fine materials and also remnants of black organic matter - thin 2-3 mm layered sticks throughout samples 9. Encrustations: oxidation halo ~2cm from one side	x							
SO249-DR138-9	1. Rock Type: sedimentary, siltstone 2. Size: 8x9x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: the same as -8 9. Encrustations: 2-3cm of brownish halo from two sides of sample								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR138-10	1. Rock Type: sedimentary, silt 2. Size: 7x9x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey to brownish 5. Texture / Vesicularity: massive, finely layered 7. Matrix: fine grained, fine layering, small black sticks of organic matter is distributed throughout the sample 10. Comment: typical for this dredge	x							
SO249-DR138 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR139

Komandorsky Block, eastern slope of the Komandorsky Block, eastern slope of the basement nose dredge at DR138 on western side lower section up to plateau edge

Dredge on bottom UTC 01/08/16 13:39hrs, lat 54°25.62'N, long 167°08.99'E, depth 920 m

Dredge off bottom UTC 01/08/16 15:04hrs, lat 54°26.07'N, long 167°08.74'E, depth 424 m

total volume: full to the top

Comments: Heterological dredge of sediments including volcanoclastic material. Typical rocks for the dredge: 1) sediments - layered, volcanogenic microbreccia / tuff, volcanogenic sandstones. Two type volcanics (Hbl)-CPx-Plg andesite and micro-dolerite

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR139-1	1. Rock Type: volcanic (Hbl)-CPx-Pl andesite 2. Size: 6x13x22 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, subporphyric 6. Phenocrysts: CPx, ~5-7% up to 2-3mm, Hbl 1-2%, Plg ~10-15% (elongated), Mt ~0.5-1% 7. Matrix: grey, crystallized 8. Secondary Minerals: Act-Chl after Amph 10. Comment: single rock in dredge, therefore most likely a dropstone of possible local origin	x	x						
SO249-DR139-2	1. Rock Type: subvolcanic, microdolerite 2. Size: 6x13x22 cm 3. Shape / Angularity: subangular, platy 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: medium-coarse grained crystallization, Plg-Mt (5-7%), Amph replaced wit Act-Chl (?) 10. Comment: single rock in dredge, dropstone?	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR139-3	1. Rock Type: sedimentary, sandstone 2. Size: 8x9x18 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: different grained layers, coarse-grained, then medium to fine-grained (more brownish) several repeated layers, resembles tubidite layering	x	x						
SO249-DR139-4	1. Rock Type: sedimentary, sandstones 2. Size: 14x17x22 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 7. Matrix: medium to fine grained 9. Encrustations: brown film, around 3 mm halo	x							
SO249-DR139-5	1. Rock Type: sediment, polymict microbreccia / tuff 2. Size: part of boc R, 31x13x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: clastic, rounded to angular fragments of volcanic and sedimentary rocks in fine grained matrix, clasts up to 0.5cm 7. Matrix: fine-grained 8. Secondary Minerals: Chl, oxidation 9. Encrustations: clay and Mn film on surface 10. Comment: volcanogenic breccia / tuff typical for Mednovsky Series	x							
SO249-DR139-6	1. Rock Type: sediment, volcanogenic micro breccia / tuff, altered 2. Size: part of block X, 22x23x12 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish grey with pink spots 10. Comment: rock similar to -5, more altered	x						5	
SO249-DR139-7	1. Rock Type: sediment, volcanogenic microbreccia, tuff 2. Size: 18x13x12 cm 10. Comment: rock similar to -5								

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR139-8	1. Rock Type: sediment, volcanogenic breccia 2. Size: 18x14x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark green with red spots 5. Texture / Vesicularity: clastic, basalt, palagonitized glass (green) and loose mineral crystals (Px, Plg) in fine grained matrix, clasts up to ~2cm 7. Matrix: fine grained 8. Secondary Minerals: Chl, oxidation 10. Comment: breccia typical for Medny Island clasts of aphyric asalts, oxidized, very fine grained, composition of the two basalts can be obtained by picking brown clasts from crushed fraction								
SO249-DR139-9	1. Rock Type: sedimentary, tuff, altered, contains inclusion of wood (?) 2. Size: 19x15x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: clastic: polymict fragments of basalts mineral crystals, highly altered fragments in fine grained matrix, slightly layered, contans inclusion of wood (?) 7. Matrix: fine grained 8. Secondary Minerals: extensive chl, oxidation and other low-T alteration 10. Comment: tuff (volcanogenic microbreccia, typical for Mendy Island (Mednovsky series)	x							
SO249-DR139-10	1. Rock Type: sediment 2. Size: 14x10x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: gradation from blueish green to yellowish gey with grey stripes 8. Secondary Minerals: diagenetic alteration 9. Encrustations: Mn film on surface	x							
SO249-DR139-11	1. Rock Type: sediment, turbiditic-agrilite with ash (?) layer and microbreccia 2. Size: 10x9x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: blueish green to yellowish grey banded, sharp contact between tuff (microbreccia) and fine srained yellowish grey ash layer (~3cm) with gradational contact to (overlaying) turbidite, the tuff contains fragments up to 2-3mm 10. Comment: micro grained sedimentary rock with ash layer	x							
SO249-DR139-12X	1. Rock Type: sedimentary, cherty silt 2. Size: part of a block, 60x3 x25 cm, sample 23x4x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey - dark grey, light brownish 5. Texture / Vesicularity: massive layered 7. Matrix: fine grained, several layers / packages with mico-layering of different colors (grey to brownish) with less thin layers of medium grained material 9. Encrustations: bright orange oxidation films along fractures 10. Comment: taken for archive. Dima Saveliev has taken a slice from this block for more careful study (possibly dating)								

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR139 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR140
Bathymetric high SE of Piip volcano, bathymetric high SE of the edge of volcanologists massif, NW facing slope
Dredge on bottom UTC 02/08/16 05:43hrs, lat 55°13.14'N, long 168°02.'15E, depth 3719 m
Dredge off bottom UTC 02/08/16 06:46hrs, lat 55°12.87'N, long 168°02.50'E, depth 3508 m
total volume: few rocks
Comments: one large Mn crust, six small subrounded rock framents of diverse types

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR140-1	1. Rock Type: volcanic, Ol-Plg-phyric basalt, moderately altered 2. Size: 3. Shape / Angularity: subangular 4. Color of cut surface: dark brownish grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg ~10% up to 3mm, Ol ~up to 3mm (mostly less than 0.5cm) 7. Matrix: fine grained 8. Secondary Minerals: chloritizazion of Ol 9. Encrustations: thin (~1mm) Mn crust on outer rim 10. Comment: Ol-Plg phyric basalt of possibly in situ origin, Plg is fresh and can be used for Ar/Ar dating, suitable / acceptable for GC	x	x	1				TS in Airfreightbox	
SO249-DR140-2	1. Rock Type: Mn-crust with clasts of A) sediment (up to 2cm) and B) andesite (up to 1.5cm), rounded. Rounded clasts indiacate coastal/river environment that initially eroded the rock 2. Size: 14x10x9 cm, block was 35x34x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: black-brownish with cracks, filled with brown sediment / clay 5. Texture / Vesicularity: porous 6. Phenocrysts: matrix (Mn)		x						
SO249-DR140 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR141

Bathymetric high SE of Piip Volcano, small ridge ~8km SE from the edge of the volcanologists massif, SE facing slope

Dredge on bottom UTC 02/08/16 10:56hrs, lat 55°15.28'N, long 167°43.'95E, depth 3832 m

Dredge off bottom UTC 02/08/16 12:04hrs, lat 55°15.64'N, long 167°44.50'E, depth 3597 m

total volume: Empty, except very small pieces of sediment (solidified mudstone) and sandy dropstone, ø of all rocks <5cm

Comments: one large Mn crust, six small subrounded rock frements of diverse types

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR141 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR142

Volcanologist massif, cone ~10nm NE of Piip volcano, SW-flank from bottom to top

Dredge on bottom UTC 02/08/16 16:52hrs, lat 55°31.68'N, long 167°27.'12E, depth 3737 m

Dredge off bottom UTC 02/08/16 17:53hrs, lat 55°31.83'N, long 167°27.55'E, depth 3565 m

total volume: almost empty, two small rock fragments

Comments: 1x lava top freshly broken off ground, 1x sediment

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR142-1	1. Rock Type: volcanic, fresh (basalt) 2. Size: 12x7x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey / black 5. Texture / Vesicularity: porphyric, vesicular (~5% vesicles, 2-4mm) 6. Phenocrysts: microhenocrysts, Plg (~1%, <1mm, fresh) Px (~2%, <1mm, fresh) 7. Matrix: fine grained (diabasic?), Plg+Px 8. Secondary Minerals: some Fe oxides in vesicles 9. Encrustations: thin Mn-Fe coating	x	x	1-2				TS in Airfreightbox	
SO249-DR142-2	1. Rock Type: volcaniclastic (tuff), somewhat fresh 2. Size: 11x6x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium-dark greensih-grey 5. Texture / Vesicularity: massive, fine-sand sized particles 7. Matrix: fine grained 8. Secondary Minerals: fine fractures (<1mm thick) with pyrite filling								
SO249-DR142 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Appendix 2 (Leg2 Station Details and Rock Description)

SO249-DR143

Volcanologist massif - cone at NE base of Piip volcano, E facing slope from botton to top

Dredge on bottom UTC 02/08/16 21:14hrs, lat 55°27.86'N, long 167°24.99'E, depth 3271 m

Dredge off bottom UTC 02/08/16 22:00hrs, lat 55°28.10'N, long 167°24.79'E, depth 3116 m

Total volume: empty

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR143 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR144

Volcanologists Massif - cone on NE slope of Piip volcano NE facing slope

Dredge on bottom UTC 03/08/16 01:13hrs, lat 55°26.62'N, long 167°20.02'E, depth 2360 m

Dredge off bottom UTC 03/08/16 02:12hrs, lat 55°26.53'N, long 167°19.97'E, depth 2020 m

Total volume: full

Comments: several up to 1 m ø blocks and smaller fragments of Ol-Hbl-Plg andesite lavas

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR144-1	1. Rock Type: volcanic, Ol-Hbl-Plg phyric, andesite, part of bloc X 2. Size: 23x21x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to black with light grey spots of Plg 5. Texture / Vesicularity: strongly porphyritic, slightly vesicular (~5%), contains some areas with more dense and dark GM rounded in shape, maybe xenoliths 6. Phenocrysts: microphenocrysts, Plg - 15-20%, 7mm; Hbl - 5%, 5mm; Ol - 1%, 4mm; Cpx - 1%, 2mm 7. Matrix: fine crystallized, mostly constists of Plg mircoliths with glass 9. Encrustations: some clay films on outer surface 10. Comment: Ol and CPx bearing Hbl-Pl phyric andesite with xenolith - like contrast areas of the similar mineralization. Good for GC, Ol, Hbl separation and xenolith investigation	x with xenolith	x	Plg, Hbl	Ol, Hbl, CPx, Plg, Glass			TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR144-2	1. Rock Type: volcanic, Ol bearing Hbl-Plg andesite with two contrasting parts, part of block T, single crystals 2. Size: 25x23x23 cm 3. Shape / Angularity: angular 4. Color of cut surface: two parts: lighter grey and dark grey to block with white spots of Plg 5. Texture / Vesicularity: strongly porphyritic, less massive than -1, some vesicles or cracks, black part is looking fresher than light one, see xenolith - like areas of dark part into light one 6. Phenocrysts: microphenocrysts, light part, Plg - 15-20% up to 5mm, Hbl - ~7% up to 4mm, Ol - single grains up to 2mm; dark part, Plg - 10% up to 5mm, Hbl - 5% up to 4mm, Ol - ~1% up to 2mm 7. Matrix: microlithic, light GM mostly Pl microlites with sime foggy glass (maybe altered) or cryptocrystallized dark GM more clear and glassy 8. Secondary Minerals: 9. Encrustations: -some clay minerals on outter surface and in vesicules 10. Comment: Ol and CPx bearing Hbl - Pl andesite with two contrasting parts of GM (without clear border), maybe some alterational zoning. Dark part could be good for GC and dating	x	1x light, 1x black	Plg, Hbl	Ol, Hbl, Plg		1		
SO249-DR144-3	1. Rock Type: volcanic, Ol-Hbl-Plg phyric andesite, block R 2. Size: 26x20x12 cm 3. Shape / Angularity: angular 9. Encrustations: similar to light part of -2 10. Comment: big block of Ol-Hbl-Plg phyric CPx-bearing andesite, good for GC and dating	x	x	Plg, Hbl	Ol, CPx, Hbl, Plg, Glass		2		
SO249-DR144-4	1. Rock Type: volcanic, Ol-Hbl-Plg phyric andesite, part of block S 2. Size: 45x43x30 cm 3. Shape / Angularity: angular 4. Color of cut surface: similar to -2 9. Encrustations: some clear intergrowth of Plg and Plg + Hbl + Ol(?), may contain single grains of OPx 10. Comment: big block of Ol-Hbl-Plg phyric andesite similar to -2 with fresh glass, good for GC and dating	x	x	Plg, Hbl	Ol, Hbl, Plg, OPx(?), Glass		2	TS in Airfreightbox	
SO249-DR144-5	1. Rock Type: volcanic, Ol-Hbl-Plg phyric, CPx bearing andesite 2. Size: 21x19x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: similar to -2 (light part) 10. Comment: contains some xenolith - like less crystallized inclusion, Ol-Hbl-Plg phyric CPx bearing andesite, good for GC and dating, as in -4 have plenty intergrowth of Pl+Hbl and Plg	x	x	Plg, Hbl	Ol, Hbl, Plg, Glass		2 4		

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR144-6	1. Rock Type: volcanic, CPx-OPx-Ol-Hbl-Plg phyric andesite 2. Size: 15x19x12 cm 3. Shape / Angularity: similar to -2 4. Color of cut surface: similar to -2 5. Texture / Vesicularity: similar to -2, slightly more porphyric 6. Phenocrysts: similar to -2, contains OPx and CPx in phenocrysts 7. Matrix: similar to -2 8. Secondary Minerals: similar to -2 9. Encrustations: similar to -2 10. Comment: good for GC and dating Ol separation, has some intergrowth of Ol-CPx, OPx-CPx-Ol-Plg-Hbl phyric andesite	x	x	Plg, Hbl	Ol, OPx, CPx, Hbl, Glass		2		
SO249-DR144 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR145

Volcanologists massif - cone on SE slope of Piip volcano. Steep SE facing slope of the cone

Dredge on bottom UTC 03/08/16 05:36hrs, lat 55°19.27'N, long 167°20.39'E, depth 2592 m

Dredge off bottom UTC 03/08/16 06:29hrs, lat 55°19.63'N, long 167°20.30'E, depth 2251 m

Total volume: empty

Comments:

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR145 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR146

Volcanologists massif - scarp in southern base

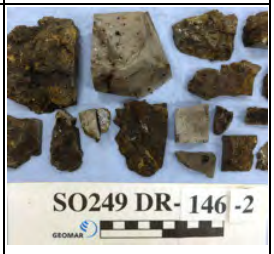
Dredge on bottom UTC 03/08/16 09:48hrs, lat 55°15.02'N, long 167°15.40'E, depth 3934 m

Dredge off bottom UTC 03/08/16 11:12hrs, lat 55°15.45'N, long 167°15.32'E, depth 3454 m

total volume: few rocks.

Comments: Pillow lava and plates of sheet lava with fresh glass. Homogeneous lithologies, rare Ol-basalts (andesites), Ol partly altered, abundant pieces with glass margins

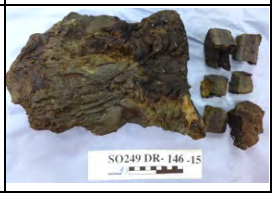
Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR146-1	1. Rock Type: volcanic, rare Ol-phyric pillow basalt (or basaltic andesite?), relatively fresh 2. Size: 14x14x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey (dark-grey, blackish at glassy margins) 5. Texture / Vesicularity: massiv, low vesicular in central part. Outer ~3 cm core more vesicular ~10%, large vesicles up to ~0.5 cm and smallers ones 6. Phenocrysts: Ol ~1%, up to ~3 mm or less, quite magnesian (transparent and with Sp) most of Ol are out on cutted surfaces, we see only negative crystall shapes. Some Ol is brownish, altered 7. Matrix: for massive and vesicular part; fine crystallized groundmass, well-crystallized (degree- is hard to say, ~10% Ol, 50-60% Plg, 5% vesicles). Fresh in central part of pillow in vesicular outer part - Ol microlites are brown - oxidized, replaced (?). There are rare vesicles filled with chalcedon. Glassy margins - outer ~0.5-1 cm of the sample black, at a closer look - dark brownish. Ol microlires inside - oxidized vesicles are not filled 9. Encrustations: thin brownsh film 10. Comment: should be good for fresh Ol; glass 1+ 1(Oleg S.)	x	x	matrix	Ol, 2 glass			TS in Airfreightbox	
SO249-DR146-2	1. Rock Type: volcanic, Ol-phyric basalt pillow (or andesite?) 2. Size: 12x9x7 cm 3. Shape / Angularity:angular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: massive, vesicular part ~5-7%, outer part 10-15% with larger (up to 1 cm) and smaller vesicles 6. Phenocrysts: Ol, the same as in #1 but more oxidized, though should be fresh parts 7. Matrix: the sme as in #1 but all Ol is altered (grownish). Matrix also seems to be more vesicles are not filled - brownish altered colour 8. Secondary Minerals: Ol is replaced with brownish stuff 9. Encrustations: thin brownish film 10. Comment: similar to #1 but more altered possibly because it is smaller. Glass (1+1 for Oleg S.)	x	x		2 glass		#1		
SO249-DR146-3	1. Rock Type: volcanic, rare Ol-phyric basalt 2. Size:11x9x7 cm 3. Shape / Angularity: subangular 10. Comment: looks similar to -2, with quite fresh core - without oxidation of Ol microlites. Glass margin from one side of the sample. Glass 1 + 1(Oleg S.)				2x Gl		#2		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR146-4	1. Rock Type: volcanic, aphyric basalt or basaltic andesite, pillow lava, relatively fresh 2. Size: 13x7x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, larger vesicles in outer part, very-small to small sized vesicles in inner part 6. Phenocrysts: few if any Ol 7. Matrix: fresh, no alteration after Ol microlites 6. Phenocrysts: few if any Ol 7. Matrix: fresh, no alteration after Ol microlites 9. Encrustations: no films 10. Comment: good for GC, glass margins 1+1(Oleg S.)	x	x	matrix	2x GL				
SO249-DR146-5	1. Rock Type: volcanic, rare Ol-phyric basalt 2. Size: 9x6x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive, evenly distributed vesicles ~5-10%, not large 6. Phenocrysts: Ol ~1%, altered 7. Matrix: fine-crystallized Ol microlites, altered 8. Secondary Minerals: after Ol - brownsh-red alteration 9. Encrustations: brownish (Mn?) films, spotty 10. Comment: overall similar to -2. One margin is partly glassy (1+1 for Oleg S.)				2x Gl, Ol		#2		
SO249-DR146-6	1. Rock Type: volcanic, rare Ol phyric basalt 2. Size: 5x8x4 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive, moderately vesicular 10. Comment: similar to -5, -2. Taken for glass margin (one side, ~0.5 cm). Glass 1+1(Oleg)				2x Gl, Ol		#2, #5		
SO249-DR146-7	1. Rock Type: volcanic, rare Ol phyric basalt 2. Size: 8x8x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: vesicles ~15% 9. Encrustations: no films, no crust 10. Comment: looks similar to -2, glassy margin from one side ~3mm thickness. Glass 1+1(Oleg)	x	x		2x GL		#2 #5		
SO249-DR146-8	1. Rock Type: Volcanic, rare Ol-phyic basalt 2. Size: 5x6x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: massive, vesicles 6. Phenocrysts: Ol crystals up to 0.7 cm in length, 7-10% altered on outer sides, looks similar to -2, 5, 7 9. Encrustations: dark-brown film partly of Mn 10. Comment: taken for glass (1 + 1 for Oleg S.), rest can be crushed for Ol (but Ol can be partly altered)				Ol?, 2x Gl		#2 #5		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR146-9	1. Rock Type: volcanic, rare Ol phyric basalt 2. Size: 7x7x4 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: similar to -5, but Ol phenocrysts not so altered - there are some fresh grains - #Mg-light-green-tranparent. But after TS, GC - only small crust left 9. Encrustations: no films 10. Comment: small piece for glassy rind, glass 1+1 for Oleg	x	x		2x Gl		#5		
SO249-DR146-10	1. Rock Type: volcanic, Ol-rare phyric basalt 2. Size: 9x4x4 cm 10. Comment: similar to -2. Ol altered, taken for glassy margin, two piecec left (glass 1+1 for Oleg). Also interesting in one piece - beginning of Mn formation - as "balls" in vesicles				2x Gl		#2		
SO249-DR146-11	1. Rock Type: volcanic, Ol-rare phyric basalt 2. Size: 5x8x6 cm 3. Shape / Angularity: angular 9. Encrustations: thin dark-brown Mn crust 10. Comment: taken for glass (1 + 1 for Oleg S.)				2x Gl, Ol		#2 #5		
SO249-DR146-12	1. Rock Type: volcanic 2. Size: 10x8x6 cm 3. Shape / Angularity: subrounded 9. Encrustations: thin dark-brown Mn crust 10. Comment: taken for glass (1+1 for Oleg S.), Two pieces left, sample is similar to -11				2x Gl		#11		
SO249-DR146-13	1. Rock Type: Volcanic, rare-Ol plates phyic basalt. 6 pieces taken for glass rinds, all angular 2. Size: A; 6x5x3 cm, B; 4x2x3 cm, C; 6x3x2 cm, D; 5x4x4 cm, E; 5x5x4 cm, F; 9x4x4 cm 10. Comment: A-D about similar to each other. Basalt is similar to -1. Similar pieces of ""hamburger type"" : two margins of glass about 0.5 - 1 cm and aphyric basalt in between = sheet lava E, F with glassy margin on one side. Some Mn precipitates on sample F surface				Gl		#1		
SO249-DR146-14	1. Rock Type: volcanic, rare Ol-phyic basalt 2. Size: 7x6x5 cm 3. Shape / Angularity: subangular 10. Comment: similar to sample -2 but altered Ol microlithes have yellow-greenish color, not brownish as in -2. Glass 1+1(Oleg)				2x Gl		#2		
SO249-DR146-15	1. Rock Type: Volcanic, rare Ol-phyic basalt, sheet lava 2. Size: Original size 27x20x15 cm (Block X) 3. Shape / Angularity: angular 10. Comment: Pahoe-hoe surface lava crust. Similar to basalt -2, -5. Demo sample, glass 1+1(Oleg)				2x Gl		#2 #5		

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR146-16	1. Rock Type: volcanic, rare Ol-phyric basalt, fresh in central part. 2. Size: 6x7x4 cm 3. Shape / Angularity: angular 10. Comment: glass sample (1+1 for Oleg)				2x Gl		#1 #2		
SO249-DR146-17	1. Rock Type: volcanic, rare Ol phyric basalt 2. Size: 10x6x6 cm 3. Shape / Angularity: angular 10. Comment: Similar to -2, -5. The sample has some minor altered layers, two pieces are taken, one of them with glass margin, glass 1+1(Oleg)				2 Gl		#2 #5		
SO249-DR146 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR147

Komandorsky Block. South of Piip volcano, N facing slope ~400 m above valley floor. Between Piip and Komandorsky Block

Dredge on bottom UTC 03/08/16 14:30hrs, lat 55°13.52'N, long 167°9.95'E, depth 2940 m

Dredge off bottom UTC 03/08/16 15:53hrs, lat 55°13.08'N, long 167°9.96'E, depth 2476 m

Total volume: 1/3 full.

Comments: Plutonic rocks: porphyritic diorites and gabbro ranging from coarsly to medium crystallized. One sample of microgabbro/dolerite. Three main types of rocks.

1) Fully crystalline porphyritic diorites with large tabular Plg (~50%) +- Hbl (~10%). The rocks represent intrusive/subvolcanic analogs of typical Plg±Hbl phyric andesites. Samples -1, -2.

2) Amphibolized gabbro, contains Plg, Cpx, Hbl. Coarse to medium grained, some samples contain large Plg up to 1 cm diameter. Cpx/Hbl present in intersticials between Plg crystalls. Plg variably chloritized. Most rocks are amphibolized - metamorphosed to variable extends. Contain abundant sulfide - products of hydrothermal alteration. Samples -3 to -15, 17.

3) Amphibolized microgabbro/dolerites. Massive, contain Plg and Cpx/Hbl in ~equal proportions. Pyrite mineralization along veins. Sample -15.

Sample #16 - gabbroic breccia

Sample #18 - Plg vein in gabbro

Sample #19X - large piece of typical gabbro.

Sample #20X (A-I) - A set of small fragments of all types of rocks.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-1	1. Rock Type: intrusive / subvolcanic, diorite/ fully crystalline andesite, slightly altered 2. Size: 12x10x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey with white and black spots 5. Texture / Vesicularity: porphyritic; fully crystallized 6. Phenocrysts: microphenocrysts, Plg 50% up to 0.5 cm, fresh cores. Hbl ~10% up to 0.5 cm long, fresh 7. Matrix: coarse crystalline aggregates of Hbl (needles); Plg and possibly Qtz 8. Secondary Minerals: Chl partly replaces Plg and/ or Hbl in matrix. 9. Encrustations: Fe hydroxides on surface; rare cracks 10. Comment: intrusiv / subvocanic analog of typical Hbl-Plg andesite; diorite. Represents a relatively minor fraction of dredge; Plg cores are good for Ar/Ar, GC - o.k.	x	x	2	Pl, Hbl		x	TS in Airfreightbox	
SO249-DR147-2	1. Rock Type: intrusive / subvolcanic, diorite (similar to -1), altered 2. Size: 16x9x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: greyish green with white spots 5. Texture / Vesicularity: porphyritic, fully crystallized 6. Phenocrysts: microhenocrysts: Plg ~50% up to cm ø 7. Matrix: Coarsely crystallized, composed by Plg, Qtz (?) an likely Hbl (replaced by Chl) 8. Secondary Minerals: extensive chloritization after Hbl. Epidote after Plg (bright light olive green). Possibly albitization. Secondary sulfide along cracks and inclusions (pyrite). Extensive veining filled with white material 9. Encrustations: Chl coating on surfaces, white veins 10. Comment: chloritized and epidotized diorite. Altered and hydrothermally altered intrusive analog of Plg phyric andesite	x	x		Plg, Sulf				
SO249-DR147-3	1. Rock Type: intrusive, amphibolitized gabbro, moderately altered 2. Size: 18x11x14 cm 3. Shape / Angularity: angular 4. Color of cut surface: spotty: dark green, white 5. Texture / Vesicularity: coarsly crystallized 6. Phenocrysts: granoblasts of Plg ~30-40% up to 0.5cm, idiomorphic. All have light grey rim and white (greenish = Chl) cores 7. Matrix: dark green Amph (perhaps after Cpx) filing interstitials together with smaller Plg crystals 8. Secondary Minerals: Chl in Plg cores, Amph after Cpx (?); white filing in cracks 9. Encrustations: Chl coating on surface 10. Comment: coarse grained relatively homogeneous gabbro with Plg porphyroblasts and Amph (Cpx?) in interstitials, moderately altered. GC - o.k. Ar/Ar is possible on Amph and perhaps Plg. The freshness of the minerals should be checked in thin section	x	x	?	Plg, Amph		x		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-4	1. Rock Type: intrusive, amphibolitized gabbro, altered / metamorphosed, similar to - 3 2. Size: 19x8x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark green ores; white veins with black spots 5. Texture / Vesicularity: massive; fully crystallized; porphyric 6. Phenocrysts: microphenocrysts: granoblasts of Plg ~50% up to 0.5cm. Amph/Cpx ~50% in interstitials between Plg 7. Matrix: coarse grained 8. Secondary Minerals: Plg partly replaced by Chl in dark cores bit white to colour less in light parts (Ab?) 9. Encrustations: white veins, Fe hydroxides on surface 10. Comment: coarse grained porphyroblastic Plg-Cpx (Amph?) gabbro. Very good for GC, Ar/Ar might be possible on Plg (?) and Amph, Zircon may be present for U/Pb dating	x	x	Plg, Amph, groundmass?			3		
SO249-DR147-5	1. Rock Type: intrusive, amphibolitized gabbro, altered. Consists of dark rounded parts separeted by white veins. 2. Size: 26x18x13 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark rounded coarse with white veins with black spots 5. Texture / Vesicularity: coarsly crystallized 6. Phenocrysts: microphenocrysts, Plg ~50% up to 1 cm; Hbl / Cpx ~50% 7. Matrix: greenish-grey matrix in dark parts and white in white veins, coarse-grained 8. Secondary Minerals: Plg in dark parts is almost completly replaced by chlorite with some rare Epidote cores. In white parts and veins Plg is probably replaced by Albite 9. Encrustations: chlorite and Fe/Mn-oxides films 10. Comment: coarse-grained Cpx (Hbl)-Plg gabbro; Chloritized with two zones: 1) dark, which is reach in chloritized Plg and 2) white with Plg replaced by Albite. Relatively good for GC. Ar/Ar could be possible	x + (x_ SAS)	x	2 Plg Hbl	Plg, Hbl				
SO249-DR147-6	1. Rock Type: intrusive, amphibolitized gabbro, similar to -5 2. Size: 17x9x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey to yellowish-grey 5. Texture / Vesicularity: coarsly crystallized 6. Phenocrysts: microphenocrysts: 7. Matrix: 8. Secondary Minerals: 9. Encrustations: very similar to -5, rare pyrite replaced by Fe-oxides (red spots) 10. Comment: coarse-grained Cpx (Hbl)-Plg gabbro. Altered by chloritization and albitization of Plg. Relativly good for GC, Ar/Ar is probably possible on Plg and Hbl	x + (x_ SAS)	x	2	Plg, Hbl		5		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-7	1. Rock Type: intrusive, amphibolized gabbro, partly altered 2. Size: 13x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: spotty, black and white 5. Texture / Vesicularity: coarsly crystallized; similar to -3 to-6 6. Phenocrysts: microphenocrysts: as -3 to -6 7. Matrix: coarse grained 8. Secondary Minerals: less and more altered parts as in -5 and -6. Dark parts - chloritized Plg; white part - albitized Plg. Dispersed and veined pyrite (fresh) 9. Encrustations: Chl films 10. Comment: coarse-grained, partly altered gabbro with Plg and Cpx (replaced by Hbl). Good for GC, Ar/Ar	x + (x_ SAS)	x	2 Plg Hbl	Plg, Hbl				
SO249-DR147-8	1. Rock Type: intrusive, amphibolitized gabbro, coarse grained medium to microgabbro 2. Size: 17x8x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey to greenish-dark grey 5. Texture / Vesicularity: coarsly crystallized; Plg-Hbl 6. Phenocrysts: microphenocrysts: Plg ~60%, typically 2-3 mm; Hbl (Cpx) ~40%, 1-2 mm, up to 5 mm 7. Matrix: coarse crystallized 8. Secondary Minerals: Plg strongly replaced by chlorite; many thin (1-2 mm) white veins cutting the rock. Pyrite is not visible in this rock 9. Encrustations: Chl films 10. Comment: this rock represents amphibolitized gabbro similar to -3 to -7 but has smaller sized crystalls, partly altered (Chl or Plg), relatively good for GC	1	1		Plg, Amph				
SO249-DR147-9	1. Rock Type: intrusive: amphibolitized microgabbro. 2. Size: 17 x 10 x 12 cm 3. Shape / Angularity: angular 4. Color of cut surface: black, grey and white 5. Texture / Vesicularity: coarse-grained, fully crystallized 6. Phenocrysts: microphenocrysts: Plg ~50% up to 4 mm, typically 1-2 mm; Hbl (Cpx) ~50% up to 4-5 mm, typically 1-2 mm 7. Matrix: coarse grained 8. Secondary Minerals: Plg is partly replaced by chlorite (grey rims). Epidote, chlorite and pyrite along thin (1-2 mm) veins. Thin sample is very rich in pyrite (present also as dispersed mineralization throughout the sample). Pyrite is sometimes replaced by Fe-oxides close to the surface of the sample. 9. Encrustations: thin Chl and Fe-oxyde film 10. Comment: this sample represents Hbl-Plg microgabbro. Partly altered, very rich in pyrite mineralization. Relatively good for GC.	x + (x_ SAS)	x		Plg, Amph				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-10	1. Rock Type: intrusive, amphibolized microgabbro 2. Size: 10x8x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: spotty: black, grey and white 5. Texture / Vesicularity: coarsly crystallized microgabbro 6. Phenocrysts: microphenocrysts: Plg ~60% up to 3 mm, typically ~1 mm; Hb l(Cpx) ~40% up to 3 mm, typically 1-2 mm. Plg is partly replaced by Chl (grey rims); Hbl/ Cpx is replaced partly by whitish minerals (seen as a net of white tiny veins or layers) 7. Matrix: fully crystallized 8. Secondary Minerals: partly altered Chl on Plg, alteration on Hbl, few Pyrite 10. Comment: microgabbo, relatively fresh and looks like leucrocratic rock when compared with -3 to -9, although the previous Plg and Hbl are almost the same, partly altered but good for GC	x + (x_ SAS)	x	2 Plg	Plg, Amph				
SO249-DR147-11	1. Rock Type: intrusive, amphibolitized microgabbro 2. Size: 16x12x12 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fully crystallized microgabbro 6. Phenocrysts: microphenocrysts: Plg ~50% up to 2 mm, typically <1 mm; Hbl ~50% up to 3 mm, typically <2 mm. Plg is strongly chloritized (grey color) 7. Matrix: fully crystallized 8. Secondary Minerals: chloritization of Plg; thin veins (<1mm) of chloritization cutting the rock, dispersed pyrite mineralization 9. Encrustations: some Chl 10. Comment: fine-grained microgabbro (amphibolitized) with ~50:50% Plg vs. Hbl. It looks like melanocratic rock but this is due to alteration of Plg (grey color), relatively good for GC	x + (x_ SAS)	x						
SO249-DR147-12	1. Rock Type: intrusive/subvolcanic, microgabbro with Plg phenocrysts 2. Size: 13x8x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey to dark grey 5. Texture / Vesicularity: fully crystallized but contains Plg phenocrysts (<10%) 6. Phenocrysts: microphenocrysts: Plg <10% up to 1-2 mm, partly altered 7. Matrix: groundmass is composed of ~50% Plg (chloritized) and ~50% Hbl/Cpx, fully crystallized 8. Secondary Minerals: Plg phenocrysts and Plg in groundmass are altered 9. Encrustations: thin Chl film on the surface 10. Comment: this sample represents porphyritic subvolcanic microgabbro (with Plg phenocrysts and Plg-Hbl groundmass). Plg is partly altered, relatively good for GC	x + (x_ SAS)	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-13	1. Rock Type: intrusive/metamorphic, metamorphized and tectonized microgabbro 2. Size: 12x6x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: fully crystallized 6. Phenocrysts: microphenocrysts, Plg ~60% up to 3 mm, typically 1-2 mm; Hbl ~40% up to 2 mm. Plg partly replaced by chlorite (grey) 7. Matrix: fully crystallized 8. Secondary Minerals: Plg is partly altered, numerous parallel veins of Chl 9. Encrustations: thin Chl film on the surface 10. Comment: this rock represents metamorphized and tectonized partially altered microgabbro with ~60:40% Plg vs. Hbl, not very good for GC	x + (x_ SAS)	x		Plg, Amph				
SO249-DR147-14	1. Rock Type: intrusive/subvolcanic, Plg-porphyritic microgabbro 2. Size: 12x6x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyroblastic, Plg phenocrysts up to 5 mm, typically 2-4 mm 6. Phenocrysts: microphenocrysts: Plg <10%, partly altered 7. Matrix: medium-grained matrix Plg+Hbl (~50:50) 8. Secondary Minerals: Plg is partly altered, Numerous thin veins, Pyrite 9. Encrustations: thin Chl and Fe-oxide film 10. Comment: this rock represents subvolcanic Plg-porphyric microgabbro. Plg+Hbl (50:50) groundmass/matrix, partly altered, relatively good for GC and Ar/Ar	x + (x_ SAS)	x	2	Plg, Amph				
SO249-DR147-15	1. Rock Type: intrusive / subvolcanic, very fine-grained microgabbro (aphyric) 2. Size: 15x15x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: aphyric, fully crystallized 6. Phenocrysts: microphenocrysts: Plg and Hbl (Cpx) ~50x50%; micron-size crystals 8. Secondary Minerals: Partly altered. Numerous veins full with pyrite + dispersed pyrite mineralizatin. 9. Encrustations: thin Chl and Fe-oxide film 10. Comment: this rock most probably represents gabbroic/ basaltic dike with aphyric/ fine-crystalline texture. Relatively good for GC. Partly altered. Pyrite mineralization along veins	x + (x_ SAS)	x						
SO249-DR147-16	1. Rock Type: intrusive/subvolcanic, metamorphosed and tectonized gabbroic breccia 2. Size: 23x16x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: metamorphosed breccia, fully crystallized 6. Phenocrysts: microphenocrysts, microgabbro 8. Secondary Minerals: metamorphosed, tectonized, altered breccia. Chl and pyrite in veins 9. Encrustations: Chl and Fe-oxide film 10. Comment: this rock represents metamorphized and tectonized fine-grained microgabbro (breccia), partly altered, not good for GC	x + (x_ SAS)	x						

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-17	1. Rock Type: intrusive, microgabbroic, similar to -5, -6, -9 2. Size: 10x5x7 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 9. Encrustations: similar to -5, -6, -9 10. Comment: this sample of microgabbro contains thick (up to 7mm) white vein	x + (x_ SAS)					5, 6, 9		
SO249-DR147-18	1. Rock Type: Plg vein (pegmatitic) in gabbro 2. Size: 6x8x5 cm 10. Comment: this sample contains very thick (up to 2mm) Plg vein	x + (x_ SAS)							
SO249-DR147-19X	1. Rock Type: gabbro 2. Size: 21x13x16 cm 10. Comment: large piece of gabbro taken as an archive sample								
SO249-DR147-20X	Comment: A set (10) of small samples representing different types of rocks described in samples -1 to-16						x		
SO249-DR147-20X-A	1. Rock type: diorite 2. Size: 9x7x10 cm								
SO249-DR147-20X-B	1. Rock type: diorite 2. Size: 10x6x9 cm								
SO249-DR147-20X-C	1. Rock type: diorite 2. Size: 12x4x8 cm								
SO249-DR147-20X-D	1. Rock type: coarse-grained gabbro 2. Size: 9x7x5 cm								

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR147-20X-E	1. Rock type: coarse-grained gabbro 2. Size: 9x6x4 cm								
SO249-DR147-20X-F	1. Rock type: medium-grained gabbro 2. Size: 7x3x8 cm								
SO249-DR147-20X-G	1. Rock type: micro-gabbro 2. Size: 10x7x11 cm								
SO249-DR147-20X-H	1. Rock type: leucocratic gabbro 2. Size: 10x6x8 cm								
SO249-DR147-20X-I	1. Rock type: micro-gabbro 2. Size: 7x5x6 cm								
SO249-DR147-20X-J	1. Rock type: gabbro 2. Size: 10x4x8 cm								
SO249-DR147 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR148

Komandorsky Block South of Piip volcano. North facing slope lowermost section

Dredge on bottom UTC 03/08/16 17:51hrs, lat 55°16.13`N, long 167°3.92'E, depth 3508 m

Dredge off bottom UTC 03/08/16 20:43hrs, lat 55°13.64'N, long 167°3.85'E, depth 3091 m

Total volume: 1/3 full

Comments: Plutonic rocks:

1) Coarse to medium grained gabbros, Massive. Contain Plg and Px in proportions 30:70 to 50:50. Moderately altered, contain some Chl and Amph after Plg and CPx, respectively. Samples -1 to -7

2) Massive microgabbro/dolerites. Samples -9 to -11

Sample -12 has contact of gabbro and dolerite. A sharp character of the contact testifies that dolerites were completely solidified and deformed when gabbro was intruded

Sample -8 is metamorphosed granoblastic gabbro (Plg granoblasts in fine grained Amf/Chl matrix)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR148-1	1. Rock Type: intrusive, melanocratic gabbro, moderatley altered 2. Size: 16x16x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: slighty greenish dark grey to black 5. Texture / Vesicularity: massive, fully crystallized 7. Matrix: Px:Pl ~20:30 both up to 0,7cm ø (coarse grained) 8. Secondary Minerals: Chl, Amph (?), replacing Pl and Opx, respectively, minor sulfide ~1mm ø evenly distributed thin veins filled with greenish white mineral 10. Comment: coarse grained melanocratic gabbro, good for GC, perhaps Ar/Ar on Plg, Amph, alteration is moderate and pervasive, Zircon may be present	x + (x_ SAS)	x	2-3	Plg, Px, Amph (?), Sulf				
SO249-DR148-2	1. Rock Type: intrusive, melanocratic gabbro, moderatley altered 2. Size: 16x14x10 cm 3. Shape / Angularity: subangular 10. Comment: melanocratic gabbro similar to -1 but has smaller grain size (max. ~3mm ø), altered outer margin with Fe-Mn oxides and thin irregular film of Fe oxides and black Mn-Fe oxides on outer surface	x + (x_ SAS)	x		Plg, Px, Amph (?), Sulf				
SO249-DR148-3	1. Rock Type: intrusive, melanocratic gabbro, moderatley altered 2. Size: 16x14x10 cm 3. Shape / Angularity: subangular 10. Comment: melanocratic gabbro similar to -1 but has smaller grain size (max. ~3mm ø), altered outer margin with Fe-Mn oxides and thin irregular film of Fe oxides and black Mn-Fe oxides on outer surface	x + (x_ SAS)	x	-	Plg, Px, Amph (?), Sulf		1		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR148-4	1. Rock Type: intrusive, gabbro, moderately altered 2. Size: 13x8x8 cm 10. Comment: gabbro similar to -3, grain size ~0.5mm (Plg=Cpx), good for GC, Ar/Ar might be possible on Plg	x + (x_ SAS)	x	~3 (Plg)	Plg,CPx		3		
SO249-DR148-5	1. Rock Type: intrusive, gabbro, moderately to strongly altered 2. Size: 16x8x14 cm 4. Color of cut surface: dark greenish grey 10. Comment: gabbro similar to -2 to -4 but more altered, contains numerous thin (<1mm) veins filled with greenish white material, secondary sulfide (pyrite?) forming segregations up to ~1.5cm and replacing Plg and occupying interstitials between Cpx crystals. Not good for GC and Ar/Ar but interesting to study trend of hydrothermal alteration in the sample suite	x + (x_ SAS)	x	~3-4 Plg	Plg, Cpx, Sulf		2 - 4		
SO249-DR148-6	1. Rock Type: intrusive, melanocratic gabbro, moderately altered 2. Size: 9x9x9 cm 4. Color of cut surface: dark greenish grey to black 10. Comment: melanocratic gabbro with Cpx/Plg ~70/30 Otherwise similar to -2 to -5. A few veins filled with white stuff. Grain size is 2-3mm, good for GC; Ar/Ar might be possible on Plg	x + (x_ SAS)	x	~2-3 Plg	Cpx, Plg		2 - 5		
SO249-DR148-7	1. Rock Type: intrusive, gabbro, moderately to slightly altered 2. Size: 12x10x5 cm 4. Color of cut surface: dark grey with white spots 10. Comment: gabbro, pretty fresh to moderately altered. Good for GC and Ar/Ar, thin white veins should be avoided, petrographically similar to -3to -5	x + (x_ SAS)	x	1-2 Plg	Cpx, Plg		3 - 5	TS in Airfreightbox	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR148-8	1. Rock Type: intrusive / metamorphic, sheared granoblastic gabbro, moderately altered 2. Size: 18x11x11 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark greenish grey to black 5. Texture / Vesicularity: granoblastic; somewhat layered; massive 7. Matrix: the rock pattern is defined by slightly elongated Plg granoblasts (up to ~5mm; fresh?) placed in fine grained dark green matrix composed by Amph (?) after Cpx. Amount of Plg ~30-40%, layered 8. Secondary Minerals :Chl and/or Amph after Cpx 9. Encrustations: some clay and/or alteration products on surface. Veins parallel to layering ~5mm thick 10. Comment: metamorphosed/sheared gabbro (nearly amphibolite). Plg appears fresh, Opx is likely replaced by Amph/Chl. Although metamorphic rock it is good for GC, Plg maybe good for Ar/Ar	x + (x_ SAS)	x	2-3 (plg?)	Cpx, Plg			TS in Airfreightbox	
SO249-DR148-9	1. Rock Type: intrusive/subvolcanic, dolerite or micro-gabbro 2. Size: 20x14x13 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey to black 5. Texture / Vesicularity: massive 7. Matrix: medium to fine grained. Plg/Px ~60/40 (stripes enriched in Plg) 8. Secondary Minerals: Amph/Chl after Cpx(?) 9. Encrustations: very thin veins of whitish material 10. Comment: fine grained dolerite/microgabbro, relatively fresh. Good for GC, dating on matrix is possible (Cpx+Plg)	x + (x_ SAS)	x	1-2 matrix	Cpx, Plg				
SO249-DR148-10	1. Rock Type: intrusive/subvolcanic, dolerite/microgabbro, slightly altered 2. Size: 11x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey to black 10. Comment: fine grained dolerite / micogabbro similar to sample -9. Contains ~1cm thick vein of coarse grained gabbro (on side); good for GC; Ar/Ar on matrix	x + (x_ SAS)	x	~2 matrix			9		
SO249-DR148-11	1. Rock Type: intrusive/subvolcanic, dolerite/microgabbro, slightly altered 2. Size: 13x11x4 cm 3. Shape / Angularity: angular 4. Color of cut surface, dark grey to black 10. Comment: fine grained dolerite/microgabbro with white ~2mm thick vein. The rock is similar to -9, good for GC, Ar/Ar dating on matrix	x + (x_ SAS)	x	~2 matrix			9		

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR148-12	1. Rock Type: intrusive / subvolcanic, contact of medium grained gabbro (similar to -3) with fine grained dolerite (similar to -9) 2. Size: 15x14x7 cm 3. Shape / Angularity: angular 10. Comment: clear magmatic contact of two major types of rocks from dredge - medium grained gabbro and dolerite. Gabbro cuts dolerite (vein into dolerite) that indicates older age of dolerite compared to gabbro. Contact is sharp, therefore dolerite was completely solidified when gabbro intruded. GC is OK but sample was mainly taken to demonstrate the relationships of two rocks	x + (x_ SAS)		2 matrix			3 and 9		
SO249-DR148-13	1. Rock Type: intrusive: gabbro with leucocratic vein 2. Size: 13x9x7 cm 10. Comment: gabbro (similar to -3) impregnated by leucocratic material. Gabbro is somewhat brecciated with diffusive cracks filled white material. The white staff could be altered aplite(?) or Plg. Only TS was made but GC is however also OK	x + (x_ SAS)		2-3 Plg	Cpx, Plg		3		
SO249-DR148 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR149

Komandorsky Block - Bering fault; South facing slope; lower part, in the middle part of pull-apart basin

Dredge on bottom UTC 04/08/16 13:26hrs, lat 56°00.70'N, long 165°01.38'E, depth 4672 m

Dredge off bottom UTC 04/08/16 14:43hrs, lat 56°01.10'N, long 165°01.53'E, depth 4176 m

total volume: 1/8 full

Comments: sediments, fairly homogeneous silty-clayish rocks, large block contains fossils or traces of fossils (worms?). All rocks smell like H_2S indicating organic material in them

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR149-1	1. Rock Type: sedimentary, silt, part of a big block 2. Size: 49x33x28 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive, some color grading from edge to inside 7. Matrix: fine grained, following for one of the pieces in detail: a) 2mm (bottom or top) greenish grey b) 1-1.5 cm - brownish layer with whitish fossils c) ~3 cm - greenish-grey d) ~3-4 cm - creamish-grey 10. Comment: fossils (worm related stuff?) in top (or bottom) layers. Fossils are flattened (almost completely), up to 3-4 cm in length, white or white-brownish tubes, supressed reaction of fossils with HCl, blocks were partly in clay					x			

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR149-2	1. Rock Type: sedimentary, silt 2. Size: 20x4x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: massive 7. Matrix: fine grained, rare small flattened pebbles (up to ~1 cm) 10. Comment: there are two separate layers (~1 cm, not constant in thickness) of medium-grained partly altered leucocratic volcanic material (?) and tephra. There are some rounded (~2-3 cm) or oval (2x4 cm) segregations with yellow-brown oxidation crust and sometimes pyritized in these medium-sized sand-tephra layers					x			
SO249-DR149-3	1. Rock Type: sedimentary, silt 2. Size: 16x10x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 7. Matrix: fine-grained with some thin leucocratic layers of sand (volcanic ?) 10. Comment: taken initially because of gliding (tectonic or mechanic ?) or friction features on both surfaces					x			
SO249-DR149-4	1. Rock Type: sedimentary, sandstone 2. Size: 10x6x4 cm 3. Shape / Angularity: rounded ("hedgehog") 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 7. Matrix: coarse grained; small gravels of 1x2 mm (~50-60%); brownish, grey, greenish rock pieces evenly distributed in grey dull cement, + reaction on HCl 10. Comment: could be segregations in silt (?)					x			
SO249-DR149-5	1. Rock Type: sediment, tuffaceous sandstone with carbonate cement 2. Size: 6x6x3 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: psamitic; clastic 6. Phenocrysts: coarse grained; diverse volcanogenic particles 7. Matrix: fine carbonate cement 10. Comment: similar sandstone forms layers in predominate turbidite facies rocks in the dredge					x			
SO249-DR149-6	1. Rock Type: sediment, tuffaceous sandstone 2. Size: 9x6x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: psamitic; clastic 6. Phenocrysts: fine to middle grained, predominately volcanogenic 10. Comment: perfectly rounded shape which indicates possible carbonate concretion					x			

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR149-7	1. Rock Type: sediment, volcanogenic turbidite with sandy layers 2. Size: 15x10x14 cm 10. Comment: predominantly turbiditic (similar to -1) with sandy (ash?) layers (similar to -5). Sandstone has carbonate cement. Sandstone may represent ash layer (Qtz, Plg, Amph ?), Zircon maybe present			Zircon (U/Pb)		x	#1 #5		
SO249-DR149 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR150

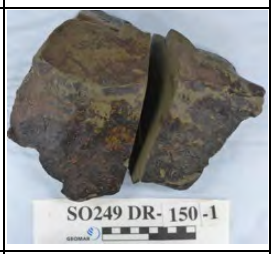
Komandorsky Canyons - Pull apart basin along WNW striking fault. Southern margin at base of NNE dipping slope

Dredge on bottom UTC 04/08/16 18:44hrs, lat 55°56.22'N, long 165°03.85'E, depth 4447 m

Dredge off bottom UTC 04/08/16 20:04hrs, lat 55°55.79'N, long 165°03.65'E, depth 4030 m

Total volume: 1/2 full

Comments: Turbiditic rocks with sandy layers. Few dropstones

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR150-1	1. Rock Type: sedimentary, turbiditic 2. Size: 22x20x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish-brownish green 5. Texture / Vesicularity: massive 7. Matrix: mud, some streaks of Fe-oxide, few Mn dendrites 9. Encrustations: Mn crust <1 mm, some Fe coating					x			
SO249-DR150-2	1. Rock Type: sedimentary, turbiditic with sandy layers 2. Size: 13x12x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greyish-brownish green, tan 5. Texture / Vesicularity: mostly massive (same as -1), sharp contrast with laminated (~1 cm scale) fine sand/mud 7. Matrix: mudstone. Same as -1. Sand ~70% Qtz (?). Mn dendrites in sandy portion 9. Encrustations: thin Fe-Mn coating					x	1		
SO249-DR150-3	1. Rock Type: sedimentary, turbditic 2. Size: 15x11x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive 7. Matrix: turbiditic, 1-3% fine sand. Patches of fine to coarse sand-sized mineral grains (up to 3-4 mm). Larger grains are subrounded, some Px, possibly altered Fsp 9. Encrustations: Fe-Mn coating					x			

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR150-4	1. Rock Type: intrusive, fresh 2. Size: 13x7x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: medium grey, dark blueish grey, black 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: Px (25-30%, up to 4 mm, most ~2 mm) 7. Matrix: medium-grained, Plg, Px+Amph (?), Albite (?) 8. Secondary Minerals: few fine veins (<1 mm) with Act / Chl filling 9. Encrustations: very thin Fe coating 10. Comment: dropstone				Px, Plg, Amph?				
SO249-DR150-5	1. Rock Type: volcanoclastic 2. Size: 9x6x3 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: porphyritic, massive 6. Phenocrysts: mafic fragments up to 15-20 mm, subangular, some have ~1 mm vesicles filled with greenish mineral. Mafic fragments make up 50-60% of rock. 7. Matrix: fine-grained, very dark greenish-grey material 8. Secondary Minerals: few fine veins (<1 mm) with white filling 9. Encrustations: thin Fe coating 10. Comment: dropstone?								
SO249-DR150 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR151									
Komandorsky Block - Bering fault, NE facing slope									
Dredge on bottom UTC 05/08/16 01:36hrs, lat 55°49.60'N, long 165°26.73'E, depth 3520 m									
Dredge off bottom UTC 05/08/16 02:59hrs, lat 55°49.15'N, long 165°26.69'E, depth 3171 m									
total volume:	few rocks								
Comments:	soft sediments; a few small rock fragments - drop stones								
SO249-DR151 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR152

Komandorsky Block - Northern slope of the Komandorsky Block ~70 km to north-west from the northern tip of Bering Island; lower part of the

Dredge on bottom UTC 05/08/16 08:22hrs, lat 55°38.76'N, long 165°42.03'E, depth 3386 m

Dredge off bottom UTC 05/08/16 09:46hrs, lat 55°38.39'N, long 165°41.99'E, depth 2947 m

total volume: 1/3 full

Comments: Heterolithological dredge. -1 to -6 + 11 mafic volcanics, -7+8 andesite, -9+10 aphyric lava, -12 reddish oxidized lava pebbles, -14+15 rhyolite with flow banding, -16 to 18 volcanoclastic sediments variyng in grain size, -21 + 22 dark and light colored chert. Sample -19 and -20 are rare Px phyric adesites - possible high Mg-andesites of A (Adak)-type

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-1	1. Rock Type: volcanic, miro-dolerite (?), moderately altered 2. Size: 13x9x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: (greenish) grey 5. Texture / Vesicularity: massive, almost no vesicles (or disappeared during alteration) 7. Matrix: fine grained, microlite texture Plg in microlite, mafic mineral and groundmass are completely replaced, altered 8. Secondary Minerals: Chl?, Pyrite in some cracks 9. Encrustations: light brownish to dark-brown (Mn) film/ crust (~0,5mm) 10. Comment: late Plg microlites in groundmass?	x	x	Plg in groundmass?			X	TS in Airfreightbox	
SO249-DR152-2	1. Rock Type: volcanic, micro-dolerite, moderately altered 2. Size: 17x6x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, possibly 1-2! vesicles 10. Comment: Looks similar to -1, there are pyrite segregations along cracks, rounded and partly oxidized	x	x				#1		
SO249-DR152-3	1. Rock Type: volcanic, Plg-phyric andesite, moderatley altered 2. Size: 14x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, vesicles 2-3% 6. Phenocrysts: Plg ~2-3%, up to 1cm, ~fresh, first generation, ~second generations Plg ~2-3mm and Amph (almost completely replaced with Chl) ~1-2%, Mt ~0.2-0.5mm - as subphenocrysts ~1% 7. Matrix: medium to finely crystallized, large microlites dominate, Amph on glass completely replaced with light greenish-blueish stuff (~chlorite), but Plg is fresh 8. Secondary Minerals: Chl / Act after Amph or glass in groundmass 9. Encrustations: no films on sample, but oxidation halo ~2-3cm around sample and inside halos, possibly along the cracks 10. Comment: tried to take sample on GC without oxidation halos	x	x	Plg, Plg in groundmass					

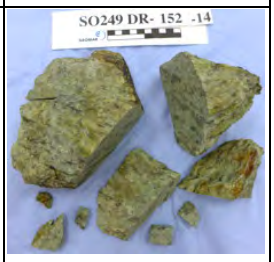
Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-4	1. Rock Type: volcanic, Plg-phyric ~basaltic andesite 2. Size: 13x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, no vesicles 6. Phenocrysts: Plg (first genertion), ~5%, white, dull, 2-5mm not carbonatized, no HCl reaction, Plg (second generation) ~5-9%, also white, dull, possibly fresh, 0.5-2mm size; there are often Plg segregations of seveal crystals with minor Amph (altered now, chloritized), Sp (Mt?) and Sulfides (?), (pyrite?) 7. Matrix: finely crystallized when wet then brownish grey, contain two angular xenoliths, 1-2 cm of turdititic (?) and greenish tuff (?) and two homogeneous (?) rounded inclusions 0.5 to 2cm of cholerites (?) 9. Encrustations: no crust, no films, minor brownish spots 10. Comment: Looks similar to -1, there are pyrite segregations along cracks, rounded and partly oxidized	x	x	Plg I, Plg II					
SO249-DR152-5	1. Rock Type: volcanic / metamorphosed?, Amph-Chloritized Px (?) basalt (?) or dolerite 2. Size: 20x9x8 cm 3. Shape / Angularity: subangular - subrounded 4. Color of cut surface: dark grey, black-spotty-grey 5. Texture / Vesicularity: massive 6. Phenocrysts: possibly Px (now replaced with Amph) ~1-2% up to 5-7 mm. There are some typical Px 8-side sections 7. Matrix: fully crystallized. Microlites of Plg (chloritized), Px (?) - amphibolitized 8. Secondary Minerals: Chl affter Plg; Amph - after Px 9. Encrustations: no films, no encrustation	x + (x_ SAS)	x						
SO249-DR152-6	1. Rock Type: volcanic, aphyric meta-andesite (?) meta-basite (?) 2. Size: 16x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey; black-spotty grey 5. Texture / Vesicularity: massive, possibly originally vesicular 7-10% (vesicles are now completely filled with black stuff 7. Matrix: medium to finely crystallized Plg microlites, Px (?) - Hbl (?), now replaced with Chl-Amph 8. Secondary Minerals: black stuff in vesicles (?) Amph-Chl after Hbl-Px in groundmass 9. Encrustations: brownish spots of Mn 10. Comment: there is a thin halo ~0.5 cm around, but possibly this is more rapidly quenched margin	x + (x_ SAS)	x						
SO249-DR152-7	1. Rock Type: volcanic, andesite with altered surface 2. Size: 12x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey 5. Texture / Vesicularity: porphyric, massive 6. Phenocrysts: total ~15-18%, Amph <3-5% from 0.5 to 3-4 mm; Plg ~10%, <1mm 7. Matrix: fine-grained 8. Secondary Minerals: some alteration of Plg phenocrysts 10. Comment: andesite, sligtly altered	x	x					TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-8	1. Rock Type: volcanic, strongly altered basalt 2. Size: 8x7x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: subaphyric with single large (from 0.5 to 1.5 cm) vesicles with irregular form 6. Phenocrysts: microphenocrysts: ~5% (Px, Ol?) 0.2-0.3 mm 7. Matrix: fine-grained 8. Secondary Minerals: albite and other secondary minerals in large vesicules and by cracks 10. Comment: srongly altered basalt	x	x						
SO249-DR152-9	1. Rock Type: volcanic, strongly altered basaltic breccia 2. Size: 9x11x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey, brownish and red on the surface 5. Texture / Vesicularity: fragments of porous basaltic lava in the crust of breccia of similar rocks 6. Phenocrysts: phenocrysts of lavas fragments: up to 15-20%; Cpx - 5-7% (~0.5 mm); Plg ~10% (0.5-1 mm) 7. Matrix: fine-grained and vesiculated. Vesicules have isometric and irregular forms 8. Secondary Minerals: calcite and other in vesicules, extensive oxidization in cracks of breccia crust 10. Comment: strongly altered basaltic breccia								
SO249-DR152-10	1. Rock Type: volcanic, strongly altered basalt with oxidized surface 2. Size: 9x11x5 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: subaphyric, vesiculated with elongated vesicles (from 2 to 10 mm) 6. Phenocrysts: rare Plg and CPx (~5%) up to 3 mm 8. Secondary Minerals: Fe oxides in vesicles and on the surface, limonite? 10. Comment: strongly altered basalt	x	x						
SO249-DR152-11	1. Rock Type: volcanic, with altered surface 2. Size: 30x11x24 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with greenish surface 5. Texture / Vesicularity: massive, fine-grained, micro-dolerite with areas of more larger crystals 6. Phenocrysts: small Plg and Px grains <0.3 mm in more crystallized areas, Plg crystals up to 2-3 mm 7. Matrix: fine-grained 8. Secondary Minerals: Chl, Fe-oxides in the cracks 10. Comment: good for GC in comparison with previous samples	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-12	1. Rock Type: volcanic, strongly altered 2. Size: 7x8x5 cm (a) and 9x7x4 cm (b) 3. Shape / Angularity: rounded 4. Color of cut surface: brownish red 5. Texture / Vesicularity: breccia with massive and porous fragments of basaltic lavas 6. Phenocrysts: in basaltic fragments; CPx (~7-10%) - up to 2 mm and Plg (>10%) - 1-2 mm 7. Matrix: fine grained in the basaltic fragments and clastic in the breccia part 8. Secondary Minerals: calcite in the cracks and surface, Fe oxides 10. Comment: strongly altered, -12A through -12E taken as individual pebbles. 12A shown as example in right column								
SO249-DR152-13	1. Rock Type: volcaniclastic, breccia, altered 2. Size: 11x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey clasts in greenish matrix 5. Texture / Vesicularity: clastic, with massive and porous areas 6. Phenocrysts: porous areas look like glassy CPx basalt (CPx phenocrysts up to 2-3 mm, rare). Massive clasts are well-crystallized Cpx-Plg altered basalt (?) 7. Matrix: clastic, coarse-grained 8. Secondary Minerals: mainly Chl 10. Comment: thin section is nesessary, porous clasts of basalt can be in reaction with matrix	x							
SO249-DR152-14	1. Rock Type: volcanic, metamorphosed pyroclastic rock or ignimbrite 2. Size: 25x16x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: green and grey layers 5. Texture / Vesicularity: layered; porphyritic within green layers; thin lamination and brecciation within grey layers 6. Phenocrysts: green layers contain altered Plg phenocrysts up to 3 mm, typically < 2mm; 70%; 30% - groundmass. Grey layers contain black clasts (?glass?Hbl) 7. Matrix: altered fine-grained matrix yellowish-white in green layers; grey in grey layers. 8. Secondary Minerals: strongly altered; Plg is green-colored 9. Encrustations: chloritization on surface 10. Comment: this sample represents metamorphosed pyroclastic or ignimbritic rocks; strongly altered; with silicic green layers and Hbl rich or glassy grey layers	x							
SO249-DR152-15	1. Rock Type: volcanic: metamorphosed pyroclastic or ignimbritic rock 2. Size: 18x9x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-white and grey layers 5. Texture / Vesicularity: same as -14 but thinner and more pronounced layering 10. Comment: this sample is similar to -14 but is composed of thinner greenish-white (most probably silicic) and grey (Hbl or glass) layers, strongly altered	x					14	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-16	1. Rock Type: sedimentary, coarse-grained tuff, part of block M 2. Size: 32x16x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: clastic, massive 7. Matrix: clasts are represented by Plg and Cpx/Hbl Matrix/cement: altered fine-grained 8. Secondary Minerals: partly altered 9. Encrustations: thin Chl and Fe-oxide film 10. Comment: coarse-grained tuff; partly altered	1							
SO249-DR152-17	1. Rock Type: sedimentary, medium-grained volcanogenic sandstone. Part of Block "E" 2. Size: 27x17x23 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: clastic with medium-grained matrix and large clasts (up to 4 cm); subrounded clasts 8. Secondary Minerals: partly altered 9. Encrustations: thin Chl film 10. Comment: volcanogenic sandstone with clasts up to 4 cm, partly altered	x + (x_ SAS)							
SO249-DR152-18	1. Rock Type: sedimentary, volcanogenic sandstone 2. Size: 20x16x10 cm 3. Shape / Angularity: angular 4. Color of cut surface: dark grey with white spots 5. Texture / Vesicularity: coarse-grained 7. Matrix: altered Plg grains (up to 3 mm) in grey cement 8. Secondary Minerals: partly altered 9. Encrustations: Chl and Fe-oxide film 10. Comment: volcanogenic sandstone; partly altered	x							
SO249-DR152-19	1. Rock Type: volcanic, CPx-porphyric andesite (adakite?), partly altered groundmass 2. Size: 13x14x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: porphyritic 6. Phenocrysts: CPx (<1%) up to 4 mm, typically 1-2 mm; Hbl? 7. Matrix: almost fully crystallized Plg-Cpx GM fine grained, partly altered 8. Secondary Minerals: partly altered 9. Encrustations: thin Chl + Fe-oxide film 10. Comment: subvolcanic andesite, CPx-porphyritic (<1%); Plg-CPx groundmass, partly altered	x	x		Cpx, Plg			TS in Airfreightbox	
SO249-DR152-20	1. Rock Type: subvolcanic, CPx-andesite partly altered 2. Size: 14x10x7 cm 3. Shape / Angularity: similar to -19 10. Comment: subvolcanic andesite similar to -19. One piece for Roman Botcharnikov	x	x		Cpx, Plg		19		

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR152-21	1. Rock Type: sedimentary 2. Size: 22x10x5 cm 3. Shape / Angularity: angular 4. Color of cut surface: greenish-grey 5. Texture / Vesicularity: clastic; breccia with fine cement 8. Secondary Minerals: altered 9. Encrustations: Chl 10. Comment: sedimentary breccia								
SO249-DR152-22	1. Rock Type: sedimentary, laminated argillite 2. Size: 9x12x6 cm 3. Shape / Angularity: angular 4. Color of cut surface: whitish-grey 7. Matrix: fine-laminated argillite 9. Encrustations: Fe-oxide film 10. Comment: laminated argillite								
SO249-DR152-23X-A	1. Rock Type: identical to -19 and -20 2. Size: 14x10x5 cm						19 20		
SO249-DR152-23X-B	1. Rock Type: identical to -19 and -20 2. Size: 15x13x6 cm						19 20		
SO249-DR152-23X-C	1. Rock Type: identical to -19and -20 2. Size: 18x15x5 cm						19 20		
SO249-DR152 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR153

Komandorsky Block - Western termination of Northwestern- Southeastern striking slope of DR152, ~7nm SSW of Dave Scholl's Adakite location. NW facing slope where contours bend N-S over a short distance. Lower to mid section.

Dredge on bottom UTC 05/08/16 15:02hrs, lat 55°38.31'N, long 165°00.70'E, depth 2160 m
Dredge off bottom UTC 05/08/16 16:35hrs, lat 55°37.95'N, long 165°01.39'E, depth 1630 m

total volume: 3/4 full

Comments: Heterolithological, mostly volcanics. Most of rocks have rounded shape and represent diverse petrographic types. The rocks are likely beach cobbles and pebbles. Main types of volcanic rocks:
Type 1: Pl-phyric and nearly aphyric vesicular basalts from large blocks. The rocks contain large flattened vesicules up to 1.5 cm long, unequally distributed in rock and forming layers enriched in vesicules interlayered with vesicule-free zones. The rocks are relatively fresh and good for geochemical studies. Samples -1 to -4.
Type 2: Cpx-Ol-Pl-phyric variably vesicular basalts with the amount of phenocrysts up to 40%. Cpx and Pl are fresh Ol is fresh in sample -17. The samples vary from strongly altered to fairly fresh. Samples -5 to -7, -12, -13, -17.
Type 3: Nearly aphyric to rare Pl-phyric fine crystallized basalts. Samples -9, -10, -11, -15.
Type 4: Rare Ol-Pl-phyric basalts. The rocks may be analogous to those from Mednovsky Suite on Medny Island. Samples -20, and preliminarily samples -4 and -21.
Type 5: Mega Hbl-phyric andesite/basaltic andesite - spessartites. Similar rocks occur as dikes on Medny Island and in southern part of Bering Island.
Sedimentray rocks in the dredge are represented by: sandstones - samples -23,-25 to -28, breccia - sample -22; conglomerate - sample -24; Mn crust - sample -30.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-1	1. Rock Type: volcanic, Cpx-Plg basalt, Part of block R 2. Size: 22x15x14 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark-grey 5. Texture / Vesicularity: porphyritic; non vesicular 6. Phenocrysts: Cpx (<2%) up to 3 mm, typically <1 mm, Plg (<10%) up to 4 mm, typically 1-2 mm; altered, Chl 7. Matrix: fine-grained groundmass, no visible glass, partly altered 8. Secondary Minerals: partly altered, chloritized Plg (greenish color) 9. Encrustations: thin Chl film 10. Comment: Cpx-Plg porphyritic basalt. no vesicules, crystallized groundmass, partly altered, relatively good for GC	x	x		Cpx, Plg			TS in Airfreightbox	
SO249-DR153-2	1. Rock Type: volcanic, aphyric vesicular basalt, part of block H 2. Size: 52x23x17 cm 3. Shape / Angularity: angular 4. Color of cut surface: light grey 5. Texture / Vesicularity: aphyric, vesicular, up to 1.5 cm, elongated, typically 2-3 mm; distribution is inhomogenious; in some parts can be up to 10-15%, in others <1% 6. Phenocrysts: 7. Matrix: fine-grained, crystallized groundmass (Plg+Cpx?) 8. Secondary Minerals: fairly fresh; vesicles are filled with Qtz or calcite (but no reaction with HCl (?!) 9. Encrustations: thin film of Chl + Fe-oxide 10. Comment: aphyric vesicular basalt. Fairly fresh except filling of the vesicles with secondary minerals, good for GC (vesicle-free part)	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-3	1. Rock Type: volcanic, Cpx-Plg - phyric vesicular basalt, relatively fresh, part of Block U 2. Size: 24x20x16 cm 3. Shape / Angularity: angular 4. Color of cut surface: light-grey 5. Texture / Vesicularity: porphyric, vesicular, inhomogeneous distribution of vesicles (up to 10-15%) up to 1.5 cm in size, typically 2-3 mm 6. Phenocrysts: Cpx (<1%) up to 1 mm; Plg (<1%) up to 2mm 7. Matrix: fine-grained crystallized matrix 8. Secondary Minerals: partly altered, but low degree of alteration; vesicles are filled with secondary minerals 9. Encrustations: thin film of Chl + Fe-oxide 10. Comment: Cpx-Plg phyric vesiculated basalt, fairly fresh (except filling of the vesicles), good for GC	x	x		Cpx, Plg				
SO249-DR153-4	1. Rock Type: volcanic, Plg-Ol basalt, vesicular, partly altered 2. Size: 16x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey with white spots 5. Texture / Vesicularity: porphyritic, vesicular, inhomogeneous distribution of vesicles (up to 15%) 6. Phenocrysts: Plg (<1%) <2 mm, typically <1 mm; Ol (<5%) up to 4 mm, typically 1-2 mm 7. Matrix: fine-grained crystallized groundmass 8. Secondary Minerals: partly altered; Ol is dark green. All vesicles are filled with white and green secondary minerals 10. Comment: porphyritic Plg-Ol basalt, partly altered, vesicular, relatively good for GC	1	1		Plg, Ol				
SO249-DR153-5	1. Rock Type: volcanic, Plg-porhyric basalt, partly altered 2. Size: 13x8x5 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey with white spots 5. Texture / Vesicularity: porphyritic (Plg), vesiculated (<10%), vesicles are up to 5 mm (typically 2-3 mm) 6. Phenocrysts: Plg (<25%) up to 2 mm, typically 1-2 mm; partly altered 7. Matrix: fine-grained crystallized groundmass 8. Secondary Minerals: partly altered, vesicles are filled with secondary minerals 10. Comment: Plg-porphyric basalt, vesiculated, partly altered, relatively good for GC	x	x		Plg			TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-6	1. Rock Type: volcanic, Plg-porphyric basalt, partly altered 2. Size: 16x12x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: grey with white spots 10. Comment: Plg-porphyritic basalt, vesicular, very similar to -5, but contains less but larger Plg phenocrysts, partly altered, relatively good for GC	x	x		Plg				
SO249-DR153-7	1. Rock Type: volcanic, Plg-CPx - porphyritic basalt, slightly vesiculated, altered 2. Size: 13x9x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish-grey 5. Texture / Vesicularity: Plg-porphyritic, slightly vesiculated 6. Phenocrysts: Plg ~10-15% <1 mm (fresh); CPx ~1-2% <1 mm (fresh dark green) 7. Matrix: brown, fine crystallized 8. Secondary Minerals: black and white fillings in voids; oxidation and palagonitization of glass in matrix 9. Encrustations: very thin cracks 10. Comment: good for GC and perhaps Ar/Ar (GM, Plg)	x	x	Plg?, 2-3	Plg, Cpx				
SO249-DR153-8	1. Rock Type: volcanic, Plg-CPx (±Ol?) porphyric basalt, slightly altered, similar to -7 with bigger vesicles filled with blueish and white material 2. Size: 18x10x7 cm 10. Comment: relatively good for GC, Plg-Cpx porphyric basalt, strongly vesiculated, matrix seems relatively fresh, dark vesicle fillings should be avoided during preparation for GC	x	x	2-3 matrix	Plg, CPx, Ol? (alt?)		7		
SO249-DR153-9	1. Rock Type: volcanic, very rare Pl-CPx phyric basalt, moderately altered. 2. Size: 26x12x11 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg <1% 0.5-1.5 mm; CPx <1% 0.5-1 mm 7. Matrix: fine-grained; doleritic 8. Secondary Minerals: Chl in matrix; ~2 cm alteration halo with gradual transition to less altered core 9. Encrustations: thin Mn outer film (<0.5 mm) 10. Comment: Good for GC, Ar/Ar might be possible on matrix (?)	x	x	matrix (?)	Plg, CPx			TS in Airfreightbox	

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-10	1. Rock Type: volcanic, rare Plg-Px phyric basalt - basaltic andesite, moderately altered 2. Size: 12x10x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light greenish grey 5. Texture / Vesicularity: massive; rare porphyric 6. Phenocrysts: Plg <1-2% <1-1.5 mm; CPx <1% ~0.5 mm; xenoliths of dark grey vesicular, fine-grained basalt and segregation of CPx (?) not equal to Ol (?) 7. Matrix: very fine crystallized; slightly fluidal (dark and light stripes) 8. Secondary Minerals: Chl after glass (?) in matrix; some minor spotty oxidation 9. Encrustations: thin cracks filled with Fe hydroxides and white minerals 10. Comment: relatively good for GC but xenoliths are difficult to avoid when crushing	x	x	?	CPx, Plg?		9		
SO249-DR153-11	1. Rock Type: volcanic, rare CPx-Plg phyric basalt, slightly to moderately altered 2. Size: 11x9x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: slightly porphyric, vesicles 5-7% (white and black fillings) 6. Phenocrysts: Plg (~10%, 0.5-1mm); CPx (≤1-2%, ~0.5mm) in intergrowth with Plg 7. Matrix: fine grained, well crystallized 8. Secondary Minerals: Chl in matrix, oxidation along cracks 9. Encrustations: oxidation in cracks; oter cracks (Qtz) filled with white mineral and contains secondary pyrite (cubic) crystals 10. Comment: somewhat more altered compared to other samples and contains secondary sulfide mineralization	x	x		Plg (CPx)				
SO249-DR153-12	1. Rock Type: volcanic, Plg-CPx basalt, moderately to strongly altered 2. Size: 13x12x11 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: black with white spots 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: CPx (10-15%, 1-2mm, fresh); Plg (20-25%, 1-3mm, ±fresh) 7. Matrix: medium to coarse crystallized, composed by CPx + Plg + greenish-greyish amorphous material 8. Secondary Minerals: abundant Chl ± Zeolites in matrix. Chl partly replaces Plg 9. Encrustations: thin Mn crust on outer surface 10. Comment: not so good for GC due to abundant vesicles in matrix. Plg is however fresh and maybe good for Ar-Ar dating, large fresh CPx	x	x	2-3 (matrix, Plg)	Plg, CPx		x		
SO249-DR153-13	1. Rock Type: volcanic, Plg-CPx phyric basalt, moderately to strongly altered, similar to -12 2. Size: 13x7x6 cm 10. Comment: the sample is petrographycally simlar to -12 but less vesicular (~no vesicles), moderately to strongly altered. Plg is yellow yet transparent and maybe suitable for Ar-Ar dating. Alteration is pervasive and difficult to avoid by picking fresh parts	x	x	?	Plg, CPx				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-14	1. Rock Type: volcanic, Plg phyric basaltic-andesite 2. Size: 12x12x8 cm 3. Shape / Angularity: rounded 4. Color of cut surface: dark grey with white spots 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Plg (20-25%, 1-2mm, somewhat altered) 7. Matrix: very fine grained / aphanitic (altered) 8. Secondary Minerals: Plg altered to foggy, pervasive (?) matrix alteration 9. Encrustations: about 2-3mm halo near margin of piece 10. Comment: hard and dense rock but has altered matrix with sulfide, GC maybe problematic	x	x	?	Plg + Sulfides				
SO249-DR153-15	1. Rock Type: volcanic, rare Plg-Px phyric basalt, moderately to slightly altered (in core). Similar to -9 & -10 2. Size: 11x7x6 cm 3. Shape / Angularity: subrounded 10. Comment: the sample core seems relatively fresh and good for GC. Matrix is coarsely crystallized and maybe suitable for Ar-Ar dating	x	x	1-2	Plg, CPx				
SO249-DR153-16	1. Rock Type: volcanic, Ol-Px-Plg phyric basalt 2. Size: 11x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Plg (~20%, 1-2mm, fresh), CPx (~5%, 1-2mm, fresh), Ol (3-5%, 0.5-1mm) altered to black 7. Matrix: fine grained, well crystallized 8. Secondary Minerals: Fe-oxides + Chl after Ol, some blue films along cracks 9. Encrustations: thin veins with zeolites 10. Comment: core is pretty fresh (except Ol) and good for GC. Ar-Ar dating is possible on Plg and matrix	x	x	1-2 (Plg, matrix)	Plg, CPx				
SO249-DR153-17	1. Rock Type: volcanic, Ol-Px-Plg basalt, slightly altered, similar to -7 and -16 2. Size: 9x7x7 cm 10. Comment: similar to -7, -8 and -16 but has smaller size of phenocrysts and more abundant CPx (up to 10-15%), all is fresh (!), good for GC and and Ar-Ar dating	x	x	1-2 (Plg, matrix)	Plg, CPx, Ol				
SO249-DR153-18	1. Rock Type: volcanic, Mega Hbl phyric andesite / spessartite, slightly altered 2. Size: 16x10x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: light greenish grey with black crystals of Hbl 5. Texture / Vesicularity: strongly porphyritic 6. Phenocrysts: Hbl (20% up to 1.5cm long, fresh) 7. Matrix: massive, medium crystallized with Plg sub-phenocrysts 8. Secondary Minerals: some oxidation of Hbl 9. Encrustations: veins filled with cryptocrystalline material 10. Comment: very specific type of rock with gigantic Hbl crystals. Looks ok for GC, Ar-Ar on Hbl. Similar rocks are known on Medny and S. Bering Island.	x	x	1 (Amph)	Amph				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-19	1. Rock Type: volcanic, Hbl phyric andesite / spessartite, silghtly altered, indentical to -18 2. Size: 9x8x5 cm 3. Shape / Angularity: subangular 10. Comment: sample identical to -18, good fro GC and Ar-Ar	x	x	1 (Amph)	Amph				
SO249-DR153-20	1. Rock Type: volcanic, rare Ol-Plg phyric basalt, moderately altered 2. Size: 30x25x25 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey, brownish grey 5. Texture / Vesicularity: slightly vesicular; porphyritic 6. Phenocrysts: Plg (~5-10%, 1-1.5mm, altered), Ol (~5%, 0.5-1mm, altered to black) 7. Matrix: fine grained, aphanitic 8. Secondary Minerals: pervasive oxidation; glass to palagonite 9. Encrustations: veins (0.2-0.5mm) with Mn oxides on outer crust 10. Comment: relatively rare type of rock in the dredge; Ol-Plg phyric basalt. Simlar rocks are found in Mednorsky suite on Medny Island, the oldest rocks of the island	x	x	?	Plg, Ol (alt)			TS in Airfreightbox	
SO249-DR153-21	1. Rock Type: volcanic, aphyric vesicular basalt, strongly altered 2. Size: 10x8x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark brownish grey 5. Texture / Vesicularity: vesicular, all filled with Cc and other secondary mineral 7. Matrix: fine grained, cryptocrystalline 8. Secondary Minerals: pervasive alteration, a lot of secondary minerals in vesicles 10. Comment: moderately to strongly altered aphyric basalt. Not good for GC due to abundant vesicle fillings. Ar-Ar not possible. Possible analog of basalts from Mednovsky suite on Medny Island	x	x						
SO249-DR153-22	1. Rock Type: sediment, volcanogenic breccia, altered 2. Size: 14x11x10 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: orange, green, grey fragments in fine brownish grey tuffaceous matrix 5. Texture / Vesicularity: 10. Comment: fragments are mostly aphyric and Plg phyric vesicular basalts incl. pillow lava fragments with altered glass margin. Some fragments maybe Plg phyric andesites. Fragment size up to 2cm. All clasts are intensly altered, not good for geochemistry	x						TS in Airfreightbox	
SO249-DR153-23	1. Rock Type: sediment, polymict volcanogenic sandstone with worm holes 2. Size: 17x8x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey with white spots, "salt & pepper" 5. Texture / Vesicularity: medium grained in fine matrix	x							

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153-24	1. Rock Type: sediment, conglomerate with sandy matrix 2. Size: 12x11x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: predominantly black to grey fragments in light grey matrix 5. Texture / Vesicularity: well rounded fragments of basalt and medium sized grains in fine matrix of carbonate, basalts are predominantly aphyric or Px phyric								
SO249-DR153-25	1. Rock Type: sediment, polymict fine to medium grained layered sandstone 2. Size: 12x12x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light yellowish grey 10. Comment: looks relatively young and not solidified / welded								
SO249-DR153-26	1. Rock Type: sediment, volcanogenic fine grained sandstone 2. Size: 13x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: fine grained with very rare small grains up to 1-1.5mm	x							
SO249-DR153-27	1. Rock Type: sediment, very well solidified, fine grained sandstone 2. Size: 10x5x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish-black 5. Texture / Vesicularity: very fine grained massive 10. Comment: somewhat similar to chert, from first glance but sandy particles are evident under mircroscope	x							
SO249-DR153-28	1. Rock Type: sediment, volcanogenic, fine grained sandstone similar to -26, equally grained 2. Size: 17x12x10 cm 4. Color of cut surface: yellowish grey	x							
SO249-DR153-29	1. Rock Type: volcanic, rare Plg phyric andesite, moderately altered 2. Size: part of block Z, 14x14x14 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: light grey to yellowish grey (in core) 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg (~2-3%, 0.5mm, altered (?)) 7. Matrix: massive, well crystallized 8. Secondary Minerals: Chl?, Fe-oxides 10. Comment: near aphyric andesite, good for GC and possibly Ar-Ar on matrix. Adakite?	x	x	2-3 (matrix)	Plg				
SO249-DR153-30	1. Rock Type: sedment; Mn crust with sandy admixture 2. Size: 13x9x7 cm 3. Shape / Angularity: rounded 10. Comment: half to D. Savelyev								
SO249-DR153-31X	1. Rock Type: large fragment of -3								no picture taken

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR153 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR154
Komandorsky Block - SW slope of Bering Island
Dredge on bottom UTC 05/08/16 23:39hrs, lat 55°20.86'N, long 165°0.70'E, depth 4715 m
Dredge off bottom UTC 06/08/16 01:07hrs, lat 55°21.29'N, long 165°0.95'E, depth 4289 m
Total volume: empty
Comments:

SO249-DR154 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR155
Komandorsky Block - Western tip of the block, its SW facing slope, middle part
Dredge on bottom UTC 06/08/16 05:27hrs, lat 55°31.13'N, long 164°53.28'E, depth 1939 m
Dredge off bottom UTC 06/08/16 07:36hrs, lat 55°31.24'N, long 164°53.35'E, depth 1400 m
Total volume: 1/2 full
Comments: Mainly volcanoclastics (breccia, tuffs) and loose fragments of aphyric to strongly Ol-CPx-Pl-phyric basalts. Two types of breccia recognized:
1) Breccia consisting of clasts of tuffs, rare Pl-phyric and Hbl-Pl-phyric andesites. No basaltic clasts are present. Dense and well consolidated. Sample -11.
2) Breccia consisting of clasts of Ol-Px-Pl (in different proportions) basalts and single large (up to 0.7 cm) CPx crystals. Massie and well consolidated/metamorphosed. Sample -19.
Other volcaniclastic sediments are fine to coarse grained tuffs with well preserved depositional layering, individual clasts and pumice-like fragments. Samples -10, 13 to -16.
Loose volcanic rock fragments are mainly Pl-CPx phyric basalts (samples -1 to -4, -8). Some rocks contain altered olivine in amount up to 10% (Samples -2 to -4, -6, -7). Sample -5 is Ol-CPx-phyric basalt from breccia - the most primitive sample from the dredge. Sample -9 is rare Pl-phyric andesite or basaltic andesite.

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR155-1	1. Rock Type: volcanic, Ol-Px-Plg phyric basalt, moderately altered 2. Size: part of block L; 35x22x27 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark greenish grey 5. Texture / Vesicularity: massive, porpyritic, rare vesicles ≤1%, 0.5-1mm 6. Phenocrysts: Ol (~1-2%, 0.5-1mm, altered to black), CPx, Augite (2-3%, 1-3mm, fresh), Plg (20%, 1-3mm, altered?) 7. Matrix: fine grained, well crystallized 8. Secondary Minerals: pervasive moderate alteration of matrix 9. Encrustations: white veins 10. Comment: relatively good for GC, CPx and Plg are fresh, Ar-Ar ---> Plg	x	x	1-2	CPx, Plg		x	TS in Airfreightbox	
SO249-DR155-2	1. Rock Type: volcanic, Ol-Px-Plg phyric basalt, moderately altered 2. Size: 24x17x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: vesicular (vesicles filled with dark green-black material) ~5-7%, ≤1mm 6. Phenocrysts: Ol (~2-3%, 1-2mm, altered), CPx (~1%, 1-3mm, fresh), Plg (~10-15%, 1-3mm, altered) 7. Matrix: fine grained, well crystallized 8. Secondary Minerals: Plg chloritized, Ol replaced with black material (Fe-Mn Oxide), ~2cm alteration halo at the margins (yellowish grey) 9. Encrustations: very thin film of Mn oxide 10. Comment: Ol-CPx-Plg basalt similar to -1. Contains less CPx and Plg but slightly more Ol. Matrix seems to be fresh. Contains a lot of small vesicles which are difficult to avoid by picking. GC can be affected by the presence of vesicles. Ar-Ar dating may be possible on matrix. Black soft material in oval shapes can be filling of vesicles. Dark grey seems to replace Hbl(?) -not olivines- rock could be andesite	x	x	2-3	CPx (Plg, Ol)		1		
SO249-DR155-3	1. Rock Type: volcanic, strongly Ol-Px-Plg phyric basalt, slightly to moderately altered, fragment from volcanic breccia 2. Size: 15x13x45 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey with light spots 5. Texture / Vesicularity: strongly porphyritic, massive 6. Phenocrysts: Ol (2-3%, up to 5mm, altered to blueish green), CPx (~15-20%, up to 5mm, fresh), Plg (~20-30%, 1-2mm fresh) 7. Matrix: fine grained, well crystallized 8. Secondary Minerals: Chl after Ol, likely some alteration in matrix 9. Encrustations: thin (0.5mm) veins filled with white material 10. Comment: overlall similar to -1 but contains more phenocrysts. Relatively fresh (yet Ol altered) and good for GC and Ar-Ar dating (Plg, matrix)	x	x	x Plg, Matrix	CPx (Plg, Ol)		1	TS in Airfreightbox	

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR155-4	1. Rock Type: volcanic, Ol-Px-Plg phyric basalt, strongly altered 2. Size: 25x10x8 cm 3. Shape / Angularity: angular 4. Color of cut surface: brownish grey 10. Comment: petrographycally similar to -1 strongly altered. Not good for GC	x	x		CPx (Plg, Ol)		1		
SO249-DR155-5	1. Rock Type: volcanic, Ol-CPx phyric basalt, moderately altered, fragment from breccia 2. Size: 12x8x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Ol (~15%, 0.5-2mm, altered to black), CPx (~15%, 1-3mm, fresh) 7. Matrix: fine grained 8. Secondary Minerals: Ol altered 9. Encrustations: minor veins 10. Comment: Ol-CPx basalt, the most primitive of the dredge, relativley good for GC, Ar-Ar on matrix, part of the sample is breccia	x	x	2-3 (Plg)	CPx (Plg, Ol)			TS in Airfreightbox	
SO249-DR155-6	1. Rock Type: volcanic, Ol-Px-Plg basalt, moderately altered 2. Size: 13x9x10 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey (oxidation) 5. Texture / Vesicularity: porphyric massive 6. Phenocrysts: Ol (~10%, 0.5-2mm, altered to black), CPx (~10%, 0.5-1mm, fresh), Plg (~10%, 0.5-2mm, fresh) 7. Matrix: fine crystallized 8. Secondary Minerals: oxidation of matrix, Ol replaced by Fe-Mn hydroxides (Ol shape well preserved). Plg is slightly altered and yellowish staining 9. Encrustations: thin veins with white material 10. Comment: Moderlately altered / oxidized Ol-CPx-Plg phyric basalt with Plg, CPx and Ol in equal proportions. The sample is good for GC. Ar-Ar is not good due to some Plg alteration	x	x	2-3 (Plg)	CPx (Plg, Ol)				
SO249-DR155-7	1. Rock Type: volcanic, CPx-Ol-Plg phyric basalt, altered 2. Size: 23x15x8 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: massive, porphyritic 6. Phenocrysts: Ol (5-7%, 0.5-1mm, altered), Plg (30-40%, 1-2mm, altered?), CPx (<1%, 0.5-1mm, fresh) 7. Matrix: fine crystallized 8. Secondary Minerals: pervasive alteration / oxidation 9. Encrustations: veins up to ~2mm filled with white material 10. Comment: a relatively altered Cpx-Ol-Plg basalt, less suitable for GC and Ar-Ar	x	x		CPx (Plg, Ol)				
SO249-DR155-8	1. Rock Type: volcanic, CPx-Ol-Plg phyric basalt similar to -7 2. Size: 8x8x5 cm 10. Comment: strongly altered Cpx-Ol-Plg phyric basalt, core is rel. fresh but overall this sample is less suitable for GC	x	x		CPx (Plg, Ol)				

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR155-9	1. Rock Type: volcanic, rare Plg phyric andesite or basaltic andesite 2. Size: 11x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, possibly few (1-3%) small vesicles filled with blue material 6. Phenocrysts: Plg (<1%, 2-3mm, greenish grey) possibly chloritized 7. Matrix: fine grained, well crystallized. Microlites of Plg (light greenish grey) plus Amph microlites replaced with black material 8. Secondary Minerals: Chl after Plg. Chl-Act or Mn after Hbl and vesicles thin parallel veins filled with blackish dark green material - the same as the vesicle fillings 9. Encrustations: small crystals, white yellowish Qtz?	x	x						
SO249-DR155-10	1. Rock Type: sedimentary, volcaniclastic, volcanogenic sandstone 2. Size: 9x7x7 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: dark grey 5. Texture / Vesicularity: massive 7. Matrix: original depositonal layering. Sample mostly composed of medium grained paticles (~5cm) with thinner layers (~mm to 1cm) of fine grained brownish material. Medium grained part has granoblastic texture and also has oriented grains parallel to layering. It contains Plg some chloritized material. Mt is in groundmass, dark brownish in color. Material is evenly distributed 10. Comment: fine grained sandstone originated through redeposition or flow out of volcanogenic material	x	x			x			
SO249-DR155-11	1. Rock Type: sedimentary, volcanoclastic breccia 2. Size: 15x9x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: different light grey, dark grey, yellowish, brownish 5. Texture / Vesicularity: massive clastic 7. Matrix: consists mainly of large angular to subangular clasts (up to 3-4cm) of volcanic rocks. Clasts are consolidated probably with zeolites and/or Qtz together with tuff material. Clasts are a) clastic tuff, b) rare phyric andesites (altered), c) aphyric andesite, d) Hbl-Plg strongly porphyric andesite, e) smaller clasts of vesiculated tuff tuff / glass (altered) 10. Comment: good for demonstration purposes	x				x			
SO249-DR155-12	1. Rock Type: volcanoclastic breccia 2. Size: 9x7x4 cm 3. Shape / Angularity: subanglar 4. Color of cut surface: diffierent brownish, grey, yellowish 5. Texture / Vesicularity: massive, clastic 7. Matrix: differently sized clasts, angular, subangular, subrounded. Layers are up 3-4cm, smallest 2-3mm. Key feature for this breccia is presence of fresh CPx (up to 0.5-0.7 cm) as in volcanic rock clasts and as separate grains. In general it looks like larger clasts are in matrix of intermediate and smaller size cemented with zeolite-Qtz + clastic material. Major clast types are: altered Ol-CPx-Plg, vesicular basalt that differ in groundmass alteration / oxidation, porphyrity and vesicularity 9. Encrustations: zeolite crystals crusts 10. Comment: more primtive clasts than in -11. Very nice for polishing demo and student class	x			CPx	x			

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR155-13	1. Rock Type: volcaniclastic breccia, sandstone 2. Size: 18x13x9 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish grey, dark grey 5. Texture / Vesicularity: massive, clastic 7. Matrix: large (up to 2-3cm) and medium (0.5-1cm) clasts, subangular to subrounded consist of Ol-CPx-Pl pyric to porphyric and aphyric and vesicular aphyric volcanic rocks. Coarse-medium grained matrix is made of the same composition plus individual grains of CPx and groundmass. Cement could be whitish films in matrix of zeolites 10. Comment: good for demo together with whole breccia series of the dredge	x				x			
SO249-DR155-14	1. Rock Type: volcaniclastic breccia tuff 2. Size: 10x7x7 cm 3. Shape / Angularity: subangular 4. Color of cut surface: different colors, grey greenish brownish 5. Texture / Vesicularity: massive, clastic 7. Matrix: differently sized clasts of predominantly Plg phyric and aphyric. All grains put in cement of pumice type material. Pumice is white yellowish with Plg microliths and also chloritized glass shards 9. Encrustations: thin brown film of Mn 10. Comment: nice for demo and volcanolclastic lessons	x				x			
SO249-DR155-15	1. Rock Type: volcanoclastic tuff-breccia 2. Size: 13x9x5 cm 3. Shape / Angularity: subangular 4. Color of cut surface: brownish light grey 5. Texture / Vesicularity: massive 7. Matrix: rare large clasts of volcanic rocks in predominantly coarse grained granoblastic matrix with glass shards (likely fresh) 9. Encrustations: some whitish crust of zeolite 10. Comment: fresh glass shards for spot analysis	x			Gl-shards	x			
SO249-DR155-16	1. Rock Type: volcanolclastic tuff 2. Size: 13x7x8 cm 3. Shape / Angularity: subangular - subrounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: massive layered 7. Matrix: fine grained, well crystallized pumice (greenish color) partly chloritized with few layers, containing together with matrix volcanic rocks (Plg phyric to aphyric). Layers with larger clasts up to 2-3 cm and layers with several mm rock clasts. Clastic layers are enriched with glass shards, possibly partly fresh 10. Comment: nice for demonstration	x			Gl-shards	x			
SO249-DR155 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

SO249-DR156

Komandorsky Block - Western tip; SW facing slope, lower part

Dredge on bottom UTC 06/08/16 11:35 hrs, lat 55°31.56'N, long 164°51.33'E, depth 2423 m

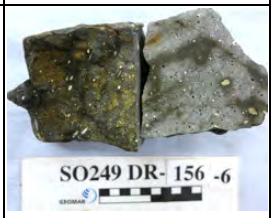
Dredge off bottom UTC 06/08/16 12:34 hrs, lat 55°31.55'N, long 164°51.33'E, depth 2450 m

Total volume: 1/2 full

Comments: Two main types of rocks: Plg-phyric to aphyric basalts (samples -1 to -6) and volcanogenic breccia (Samples - 7 to 11).
Type 1: Aphyric to Plg-phyric basalts, variably vesiculated and partly altered. Groundmass is fine-grained and vesicular. Alteration is imposed by chloritization and zeolitization.
Type 2: Volcanogenic breccias contain clasts of variable size. Some clasts are highly vesiculated (sample -7), partly altered, placed in fine-grained yellowish- to reddish- cement.

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR156-1	1. Rock Type: volcanic, aphyric basalt (?) fairly altered 2. Size: 18x11x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: ligth grey to grey 5. Texture / Vesicularity: massive; partly vesicular 7. Matrix: fine grained, well crystallized; outer part of samples is vesicular 8. Secondary Minerals: vesicles are filled with white (calcite + zeolite?) material 9. Encrustations: thin brown film (Mn?)	x	x						
SO249-DR156-2	1. Rock Type: volcanic, rare Plg- porphyric basalt modeately altered 2. Size: 13x9x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive 6. Phenocrysts: Plg Ist generation - large crystals <1%, separete or twins up to 1 cm in size, partly cloritized (greenish), fresh part can be picked out; Plg 2nd generation - ~2-3 mm, 10-15 %, most grains are partly (or fairly well) cloritized; CPx 1-2%; 0, 5-2 mm; Ol (?) - 0,5-2 mm, replaced with black material 7. Matrix: fie grained, well crystallized, chloritized 8. Secondary Minerals: Chl after Plg; Mn (?) after Ol and groundmass 10. Comment: Plg of both generations can be probably dated	x	x	Plg I, Plg II					
SO249-DR156-3	1. Rock Type: volcanic, Plg- phyric basalt moderatly altered 2. Size: 9x7x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: massive, vesicular ~5%, filled by black material 6. Phenocrysts: Plg, elongated, from 2 mm to 1 cm ~ 10%; mostly altered (cloritized; greenish light) 7. Matrix:fine grained, well crystallized 8. Secondary Minerals: Chl after Plg, black stuff (Mn?) filling vesicles 9. Encrustations: partly brownish (Mn?) film			Plg (?)					

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR156-4	1. Rock Type: volcanic, rare Cpx phyric basalt, moderatly altered 2. Size: 8x6x6 cm 3. Shape / Angularity: subangular 4. Color of cut surface: ligth grey 5. Texture / Vesicularity: massive; vesicular (?) - 5-10% secondary stuff is after vesicles 6. Phenocrysts: CPx, rare, 0,5 -2 mm < 1% 7. Matrix: fine grained, well crystallized. Some zones enriched in white- grey- greenish spot - subrounded stuff 0.5-2 size and large ones up to 1-1.5 cm. These spots are cloritized in the central part and some recrystallization around. Sometimes look like Plg crystal in alteration, but unlikely. Probably it is vesicles alteration and modification of groundmass 10. Comment: for GC should be considered with caution - due to zones with subrounded alterated (?) spot	x	x						
SO249-DR156-5	1. Rock Type: volcanic, CPx-Ol-Plg porphyric basalt, moderately altered 2. Size: part of block L 63x37x27 cm 3. Shape / Angularity: Subangular 4. Color of cut surface: brownish grey 5. Texture / Vesicularity: massive; sligthly vesiculated (<1%) up to 3 mm 6. Phenocrysts: Plg up to 1 cm; 2-3%; typically 2-3- mm 7. Matrix: fine grained altered groundmass 8. Secondary Minerals: altered brownish Plg; Fe- oxides rims around mafic mineral; vesicles filled with zeolite 9. Encrustations: thin chlorite and Fe-oxide film 10. Comment: altered Plg (+Ol?) porphyric basalt, sligthly vesicular, relatively good for GC	x	x	Plg I, Plg II					
SO249-DR156-6	1. Rock Type: volcanic, almost aphyric basalt, partly altered, highly vesicular 2. Size: 19x19x9 cm 3. Shape / Angularity: angular 4. Color of cut surface: grey 5. Texture / Vesicularity: almost aphyric highly vesicular, large vesicles (< 5%) up to 8 mm, 40 % vesicles in groundmass (< 1 mm) 7. Matrix: highly vesicular fine grained groundmass 8. Secondary Minerals: altered vesicles filled with zeolite 9. Encrustations: thin chlorite film 10. Comment: almost aphyric, altered, highly vesicular basalt, less suitable for GC	x	x						
SO249-DR156-7	1. Rock Type: sedimentary, volcanogenic; volcanoclastic breccia 2. Size: 13x10x8 cm 3. Shape / Angularity: subangular 4. Color of cut surface: reddish grey 5. Texture / Vesicularity: volcanoclastic breccia 7. Matrix: highly vesiculated greenish and orange clasts with less vesiculated reddish clasts 8. Secondary Minerals: Vesicles are filled with zeolite. 9. Encrustations: thin Chl + Fe-oxide film 10. Comment: volcanoclastic breccia, altered, clasts are highly vesicular	x	x						

Appendix 2 (Leg2 Station Details and Rock Description)

SAMPLE #	SAMPLE DESCRIPTION	TS	CHEM	Ar/Ar	GL/MIN	SED	REF	NOTES	PICTURE
SO249-DR156-8	1. Rock Type: sedimentary, volcanogenic breccia 2. Size: 25x16x9 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: volcanoclastic breccia 7. Matrix: clasts vary in size from 1 mm to 15 mm; grey, green, white and red clasts with yellowish-green cement 8. Secondary Minerals: partly altered cement 9. Encrustations: thin Chl-film 10. Comment: volcanogenic breccia with variable size of clasts from 1 to 15 mm. Fine grained cement is partly altered.	x							
SO249-DR156-9	1. Rock Type: sedimentary volcanogenic tuffs with large (3 cm) clast 2. Size: Block U: 40x32x29 cm 3. Shape / Angularity: subangular 4. Color of cut surface: greenish grey 5. Texture / Vesicularity: volcanoclastic tuff; dark grey clasts (up to 3 cm) cemented by ligth grey partly altered groundmass 7. Matrix: Large clasts (green, up to 3 cm in size) 8. Secondary Minerals: partly altered 9. Encrustations: thin Chl + Fe-oxide film 10. Comment: volcanogenic tuff with large clasts of probably silicic material, partly altered	x							
SO249-DR156-10	1. Rock Type: sedimentary, volcanogenic breccia 2. Size: block Q, 40x45x28 cm 3. Shape / Angularity: subangular 4. Color of cut surface: grey 5. Texture / Vesicularity: clastic, volcanogenic breccia; clast vary in size from 1-2 mm to 20 mm (red, green, grey) 7. Matrix: fine grained reddish green cement 8. Secondary Minerals: partly altered, zeolite in veins 9. Encrustations: thin clorite film 10. Comment: volcanogenic breccia partly altered	x							
SO249-DR156-11	1. Rock Type: volcanogenic breccia 2. Size: 15x11x6 cm 3. Shape / Angularity: subrounded 4. Color of cut surface: reddish-grey 5. Texture / Vesicularity: clastic, clasts range in size from 1-2 mm to 25 mm; reddish, greenish, grey, orange. 7. Matrix: reddsh fine grained cement 8. Secondary Minerals: partly altered 9. Encrustations: thin Chl film 10. Comment: volcanoclastic breccia partly altered								
SO249-DR156 - ST	1. Rock Type: sediment from sediment trap, dried at 110°C in single use aluminum tray							1 bag	

Appendix 2 (Leg2 Station Details and Rock Description)

Abbreviations for Minerals and Materials:

Fsp: feldspar
Plg: plagioclase
Ol: olivine
Px: pyroxene
CPx: clinopyroxene
OPx: orthopyroxene
Cc: clacite
Mn: manganese
Bt: biotite
Amph: amphibole
Hbl: hornblende
Qtz: Quartz
GM: groundmass
Mt: Magnetite
Sp: Spinel
Gt: Garnet

Abbreviations: n = number of collected samples, FIX = fixative, F4 = 4% formaldehyde solution, F6 = 6% formaldehyde solution, EtOH = 100% ethanol, AM = acetone/methanol, PFA = 4% paraformaldehyde solution, RNA = RNAlater, WP = Whirl-Pak, smt = seamount, DR = dredge, FZ = fracture zone, CTD = conductivity + temperature + pressure probe
The numbers 2, 5, 50, 100, 200, 500, and 1,000 refer to the size of the vials in ml

SO249-CTD1
CTD, no biological sampling

SO249-DR2
Amila Fracture Zone. Northern tip at lower base of N-S stricking ridge at the western margin of the FZ
Dredge on bottom UTC 08/06/16 12:26hrs, lat 50°18.40'N, long 173° 5.69'W, depth 5019 m
Dredge off bottom UTC 08/06/16 13:47hrs, lat 50°17.99'N, long 173° 5.88'W, depth 4780 m
Content: One large block and a few smaller rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR3
Amila Fracture Zone. Northern tip at lower base of N-S striking ridge at the western margin of the FZ
Dredge on bottom UTC 08/06/16 17:56hrs, lat 50°17.53'N, long 173°3.14'W, depth 5660 m
Dredge off bottom UTC 08/06/16 19:26hrs, lat 50°17.31'N, long 173°3.85'W, depth 5121 m
Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR4
Amila Fracture Zone. Northern tip at lower base of N-S striking ridge at the western margin of the FZ
Dredge on bottom UTC 08/06/16 23:46hrs, lat 50°10.91'N, long 173°10.23'W, depth 4315 m
Dredge off bottom UTC 08/06/16 01:10hrs, lat 50°10.57'N, long 173°9.70'W, depth 3896 m
Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Serpulidae	2	x								EtOH	Tubes with and without worms

SO249-DR5
Bend fault between Adam Smt and Amila FZ. NE slope of ridge between bend fault basins, ridge is occupied by small circular structures, cones
Dredge on bottom UTC 09/06/16 11:39hrs, lat 49°44.12'N, long 175°1.44'W, depth 5258 m
Dredge off bottom UTC 09/06/16 13:00hrs, lat 4943.67'N, long 175°1.22'W, depth 4784 m
Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Axinellida	1							x		F4	Crushed sponge, probably fan-shaped
	Axinellida	1				x					EtOH	Piece of crushed sponge

SO249-DR6
Adams Seamount. North slope, step on the slope near the top of the seamount, at normal bend fault cutting seamount
Dredge on bottom UTC 09/06/16 21:34hrs, lat 50°01.89'N, long 176°16.10'W, depth 3796 m
Dredge off bottom UTC 09/06/16 22:56hrs, lat 50°01.43'N, long 176°16.08'W, depth 3487 m
Content: Mostly fragments of pillow-lavas, hyaloclastites, minor group of subaerially erupted/oxidized lavas, some sediments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps - little pebbles
Macrofauna	Porifera	1			x						EtOH	
	Ophiuroidea	1			x						EtOH	
	Porifera	3			x						EtOH	
	Anthozoa	1			x						EtOH	
	Porifera	3		x							EtOH	
	Porifera	1								x	EtOH	Ca. 30 cm large, presumably fan-shaped sponge, packed in WhirlPak
	Crinoidea	1								x	EtOH	Ca. 50 cm tall (without crown), bright yellow sea lily, arms largely broken off, packed in WhirlPak
	Porifera	1								x	EtOH	Ca. 15 cm tall, grey tube sponge, probably intact, packed in WhirlPak
	Octocorallia	1								x	EtOH	Numerous samples presumably from several different individuals of a form of golden coral, packed in WhirlPak
	Ocotocorallia	1								x	EtOH	Small and large samples of the same type of branching (golden?) deep water coral, incl. a brittle star specimen wrapped around the central stem, packed in WhirlPak
	Octocorallia	1			x						EtOH	
	Porifera	15	x								EtOH	
	Serpulidae	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	Tunicata	3	x								EtOH	
	Octocorallia	3	x								EtOH	
	Brachiopoda	1	x								EtOH	Several specimens
	Bivalvia	3	x								EtOH	
	Brachiopoda	1	x								AM	Several specimens

	Bivalvia	1	x								F4	
	Brachiopoda	1	x								F4	Several specimens
	Tunicata	1	x								F4	
	Serpulidae	1	x								F4	
	Anthozoa	1	x								F4	
	Brachiopoda	1	x								RNA	Several specimens

SO249-DR7

Northern trench slope south of Adak Island. North-facing ridge on slope, northern slope of ridge from base to top

Dredge on bottom UTC 10/06/16 07:55hrs, lat 50°47.17'N, long 176°10.16'W, depth 4742m (expected 5000 m)

Dredge off bottom UTC 10/06/16 09:25hrs, lat 50°46.72'N, long 176°10.38'W, depth 4389 (4560 m expected)

Content: 1/4 full, contained a variety of lithologies ranging from aphyric to fsp phyric lavas to plutonics and metamorphic shists and local(?) solidified sediment.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1								x	EtOH	50 cm large, branching deep water coral, base broken off
	Polychaeta	3	x								EtOH	
	Porifera	3	x								EtOH	
	Cnidaria	1	x								EtOH	
	Echiura (?)	1	x								EtOH	

SO249-DR8

Adak canyon. Lower part of SE facing canyon wall

Dredge on bottom UTC 10/06/16 16:48hrs, lat 51°13.96'N, long 177°22.78'W, depth 3624 m (expected 3700 m)

Dredge off bottom UTC 10/06/16 18:22hrs, lat 51°14.44'N, long 177°22.66'W, depth 3389

Content: 1 stone, semiconsolidated sediment (meta-mudstone)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cnidaria	1						x			F4	50 cm long medusa, probably Hydrozoa
	Cnidaria	1	x								EtOH	Piece of formalin-fixed medusa
	Cnidaria	1	x								AM	Piece of formalin-fixed medusa

SO249-DR9

Adak canyon. Eastern slope of the canyon

Dredge on bottom UTC 10/06/16 21:12hrs, lat 51°20.39'N, long 177°08.03'W, depth 3333 m

Dredge off bottom UTC 10/06/16 00:07hrs, lat 51°20.73'N, long 177°07.31'W, depth 2751 m

Content: Nearly full, a large variety of volcanoc rocks recovered

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychatea	1			x						EtOH	
	Octocorallia	1			x						EtOH	
	Porifera	2			x						F4	
	Octocorallia	1			x						F4	
	Polychatea	1			x						F4	
	Crinoidea/Porifera	1						x			F4	
	Holothuroidea	1	x								F4	
	Crinoidea	1		x							EtOH	
	Porifera	1		x							EtOH	
	Octocorallia	4	x								EtOH	
	Cnidaria	1	x								EtOH	
	?	6	x								EtOH	
	Porifera	5	x								EtOH	
	Holothuroidea	1	x								EtOH	
	Polychaeta	4	x								EtOH	
	Nemertea	1	x								EtOH	
	Gastropoda	1	x								EtOH	
	Bryozoa	2	x								EtOH	

SO249-DR10

Adak canyon. Base of western slope, ca. 1.5 miles NE of DR8

Dredge on bottom UTC 11/06/16 04:04hrs, lat 51°14.89'N, long 177°20.99'W, depth 3582 m

Dredge off bottom UTC 11/06/16 05:25hrs, lat 51°15.24'N, long 177°21.28'W, depth 3280 m

Content: 1/4 full, Plg-phyric relatively fresh basalts, variably solidified sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1			x						EtOH	
	Polychaeta	1	x								EtOH	
	Porifera	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR11

Adak canyon. Exit of Adak Canyon entering the trench. E-W-striking step in trench slope

Dredge on bottom UTC 11/06/16 13:44hrs, lat 50°34.50'N, long 178°14.70'W, depth 4660 m

Dredge off bottom UTC 11/06/16 15:13hrs, lat 50°34.97'N, long 178°14.84'W, depth 3280 m

Content: One rounded piece of Ol-basalt, fresh and good for chemistry and possibly Ar/Ar on g. m.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES

Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR12

Fore Arc Ridge, extension of Adak canyon. SSE-facing slope of Fore Arc Ridge from base to top

Dredge on bottom UTC 11/06/16 19:48hrs, lat 50°42.52'N, long 177°58.29'W, depth 4348 m

Dredge off bottom UTC 11/06/16 21:17hrs, lat 50°42.84'N, long 177°58.79'W, depth 3917 m

Content: 1/2 full, a range of sedimentary rocks of variable grade of metamorphism

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1			x						EtOH	
	Algae	1			x						EtOH	
	Vertebrata	1			x						EtOH	This bone is a part of the palatine of *Anotopterus nikparini* . http://www.fishbase.org/summary/60529 ID by Dr. Senou, Kanagawa Museum, senou@nh.kanagawa-museum.jp

SO249-DR13

Amchitka Canyon. SW striking canyon wall in the lower section. SE dipping flank immediately above canyon floor (expected).

Dredge on bottom UTC 12/06/16 06:58hrs, lat 50°58.74'N, long 179°39.27'W, depth 5213 m

Dredge off bottom UTC 12/06/16 10:03hrs, lat 50°58.95'N, long 179°40.04'W, depth 5050 m

Content: Few rocks: solidified sediment + single volcanic rock (rounded), looks like diabase

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	2	x								EtOH	
	?	2	x								EtOH	

SO249-DR14

Amchitka Canyon. Eastern flank of canyon. North facing slope of E-W striking nose

Dredge on bottom UTC 12/06/16 14:51hrs, lat 51°0.66'N, long 179°26.6'W, depth 4927 m

Dredge off bottom UTC 12/06/16 16:05hrs, lat 51°0.23'N, long 179°26.61'W, depth 4619 m

Content: Few rocks, sedimentary rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cnidaria	1						x			F4	Large scyphozoan (?), presumably got entangled in dredge wiring
	Cnidaria	1		x							RNA	Part of large scyphozoan
	Cnidaria	1	x								EtOH	Part of large scyphozoan
	Anthozoa	1	x								EtOH	

SO249-DR15

Adak canyon. Lower part of SE facing canyon wall

Dredge on bottom UTC 12/06/16 20:03hrs, lat 50°57.21'N, long 179°27.48'W, depth 4683 m (expected 4900 m)

Dredge off bottom UTC 12/06/16 21:32hrs, lat 50°56.86'N, long 179°27.00'W, depth 4188

Content: 1/4 full, predominantly sandstone, breccia, mudstone, some igneous rocks.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	3	x								EtOH	

SO249-DR16

Amchitka canyon. Lower SE slope of Amchitka canyon

Dredge on bottom UTC 13/06/16 02.36hrs, lat 50°52.86'N, long 179°35.18'W, depth 5523 m (expected 5500 m)

Dredge off bottom UTC 13/06/16 04:14hrs, lat 50°52.45'N, long 179°34.90'W, depth 4991 m

Content: 1/4 full

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Crustacea	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	?	1	x								EtOH	Probably anorganic

SO249-DR17

Adak canyon. Lower part of SE facing canyon wall

Dredge on bottom UTC 10/06/16 16:48hrs, lat 51°13.96'N, long 177°22.78'W, depth 3624 m (expected 3700 m)

Dredge off bottom UTC 10/06/16 18:22hrs, lat 51°14.44'N, long 177°22.66'W, depth 3389 m

Content: Empty except for sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR18

Little seamount east beneath the Rat Frakture Zone, NE-slope of seamount

Dredge on bottom UTC 13/06/16 23:31hrs, lat 49°32.47'N, long 178°29.98'E, depth 4312 m (expected 4300 m)

Dredge off bottom UTC 14/06/16 00:55hrs, lat 49°32.81'N, long 178°30.39'E, depth 3893 m

Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR19

Very small seamount east beneath the Rat Frakture Zone
Dredge on bottom UTC 14/06/16 05:31hrs, lat 49°28.80'N, long 178°31.55'E, depth 4802 m (expected 4825 m)
Dredge off bottom UTC 14/06/16 06:49hrs, lat 49°28.34'N, long 178°31.52'E, depth 4479 m
Content: Empty except for sediment

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR20
Rat Frakture Zone
Dredge on bottom UTC 14/06/16 15:44hrs, lat 48°58.62'N, long 177°47.30'E, depth 5265 m (expected 5287 m)
Dredge off bottom UTC 14/06/16 18:41hrs, lat 48°58.40'N, long 177°47.41'E, depth 5057 m
Content: Few rocks: Mn crust, Mn nodule + ST samples

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR21
The Rat Frakture Zone
Dredge on bottom UTC 14/06/16 23:20hrs, lat 49°00.84'N, long 177°59.20'E, depth 5195 m (expected 5230 m)
Dredge off bottom UTC 15/06/16 01:20hrs, lat 49°00.65'N, long 177°59.32'E, depth 4946 m
Content: Several angular fragments of rocks of different lithology

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR22
Rat Fracture Zone
Dredge on bottom UTC 15/06/16 07:23hrs, lat 48°43.00'N, long 178°6.17'E, depth 5695 m
Dredge off bottom UTC 15/06/16 08:37hrs, lat 48°42.64'N, long 178°6.06'E, depth 5205 m
Content: Few rocks: Mn crust, Mn nodule + ST samples

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1	x								EtOH	Feces?

SO249-DR23
Rat Fracture Zone
Dredge on bottom UTC 15/06/16 07:23hrs, lat 50°0.36'N, long 170°12.00'E, depth 5028 m
Dredge off bottom UTC 15/06/16 08:37hrs, lat 50°0.82'N, long 170°12.00'E, depth 4510 m
Content: Few rocks: Mn crust, Mn nodule + ST samples

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR24
Rat Fracture Zone: W facing slope, lower part of small canyon. Profile oblique to slope
Dredge on bottom UTC 16/06/16 03:42hrs, lat 49°57.22'N, long 177°40.16'E, depth 5419 m
Dredge off bottom UTC 16/06/16 04:56hrs, lat 49°56.78'N, long 177°40.25'E, depth 5130 m
Content: 1/6 full, several dcm[?] sized rocks, aphyric lava fragments angular to subrounded, coarse grained lava, subangular with altered ol and px

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR25
Murray Canyon; Eastern Canyon wall; 3km W of WAVE DR30 (47Ma) site but lowermost section of slope
Dredge on bottom UTC 16/06/16 16:41hrs, lat 51°41.47'N, long 176°45.40'E, depth 3540 m
Dredge off bottom UTC 16/06/16 18:07hrs, lat 51°41.07'N, long 176°45.17'E, depth 3171 m
Content: 1/4 full, variably crystallized igneous rocks (lavas, dolerites, micro gabbro)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Bryozoa	1	x								EtOH	
	Porifera	3	x								EtOH	
	Ophiuroidea	4	x								EtOH	
	?	4	x								EtOH	
	Polychaeta	6	x								EtOH	
	Serpulidae	1	x								EtOH	
	Polychaeta	1						x			F4	Several specimens in tubes
	Polychaeta	1			x						F4	
	Ophiuroidea	1			x						F4	Several specimens, incl juvenile
	Ophiuroidea A1	1			x						F4	
	Ophiuroidea B1	1			x						F4	
	Polychaeta E1	1			x						F4	
	Ophiuroidea B4	1		x							RNA	
	Polychaeta E4	1		x							RNA	
	Ophiuroidea A5	1		x							RNA	
	Porifera	1		x							EtOH	
	Holothuroidea	1	x								F4	
	Porifera	3	x								F4	
	Serpulidae	1	x								F4	

	Ophiuroidea A4	1	x								AM	
	Polychaeta E5	1	x								AM	
	Ophiuroidea B5	1	x								AM	
	Ophiuroidea A3	1	x								PFA	
	Polychaeta E3	1	x								PFA	
	Ophiuroidea B3	1	x								PFA	
	Crinoidea	1	x								EtOH	
	Holothuroidea	1	x								EtOH	

SO249-DR26

Murray Canyon: NW slope in the lower part of the canyon along a realtively steep slope

Dredge on bottom UTC 16/06/16 23:44hrs, lat 51°30.67'N, long 176°06.64'E, depth 4445 m

Dredge off bottom UTC 17/06/16 01:15hrs, lat 51°31.10'N, long 176°06.50'E, depth 4067 m

Content: 1/4 full, one large fragment of igneous rock (basalt?) and mostly variably solidified deepwater sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1						x			F4	
	Polychaeta	1			x						EtOH	
	Bryozoa	1	x								EtOH	

SO249-DR27

Murray Canyon: NW slope in the lower part of the canyon

Dredge on bottom UTC 17/06/16 05:31hrs, lat 51°37.00'N, long 176°24.00'E, depth 4089 m

Dredge off bottom UTC 17/06/16 07:15hrs, lat 51°38.09'N, long 176°24.34'E, depth 3683 m

Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	1	x								F4	Probably eggs (fish?)

SO249-DR28

Murray Canyon: Eastern slope lower section below WAVE DR30

Dredge on bottom UTC 17/06/16 11:30hrs, lat 51°41.60'N, long 176°46.86'E, depth 3557 m

Dredge off bottom UTC 17/06/16 12:57hrs, lat 51°41.16'N, long 176°46.93'E, depth 2978 m

Content: Few rocks, few lava fragments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1			x						F4	
	Ophiuroidea	1			x						F4	

SO249-DR29

Murray Canyon: Eastern slope immediately further upslope of DR28, covering roughly similar stretch of WAVE DR30

Dredge on bottom UTC 17/06/16 15:22hrs, lat 51°41.27'N, long 176°47.30'E, depth 3894 m

Dredge off bottom UTC 17/06/16 16:52hrs, lat 51°40.85'N, long 176°47.51'E, depth 2377 m

Content: Full, igneous rocks ranging from fully crystalline gabbro to basalts with various transitional rocks (micro-gabbro, dolerites).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cnidaria	1						x			F4	*Physalia*
	Porifera	1			x						F4	
	Bryozoa	2	x								F4	
	?	4	x								F4	
	Porifera	2	x								F4	
	Polychaeta	2	x								F4	

SO249-DR30

Murray Canyon

Dredge on bottom UTC 17/06/16 18:59 hrs, lat 51°40.76'N, long 176°47.92'W, depth 2194 m

Dredge off bottom UTC 17/06/16 20:09hrs, lat 51°40.35'N, long 176°48.10'W, depth 1825 m

Content: 1/4 full: Three lithologies identified. Vulcanics, plutonics, and sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1						x			F4	Part 1 of 2
	Cnidaria	1				x					F4	Part 1 of 2
	Cnidaria	1			x						EtOH	
	?	1		x							EtOH	Wood?
	Porifera	1	x								EtOH	Part 2 of 2
	Cnidaria	1	x								EtOH	Part 2 of 2
	Polychaeta	2	x								EtOH	
	Bryozoa	1	x								EtOH	
	Sipuncula	1	x								EtOH	From the surface of the large sponge
	Echiura (?)	1	x								EtOH	
	?	1	x								EtOH	
	Cnidaria	1	x								EtOH	

SO249-DR31

Murry Canyon. SE slope, lower part

Dredge on bottom UTC 17/06/16 23:44hrs, lat 51°37.13'N, long 176°33.28'W, depth 4280 m

Dredge off bottom UTC 18/06/16 01:10 hrs, lat 51°36.75'N, long 177°33.56'W, depth 3863 m

Content: Few rocks: Solidified sediments, single volcanic rock

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Crustacea	1	x								EtOH	Could be planktonic
	Polychaeta	3	x								EtOH	
	?	1	x								EtOH	Egg container?

SO249-DR32

Murray Canyon. Base of western section of N slope

Dredge on bottom UTC 18/06/16 05:48hrs, lat 51°30.48'N, long 176°03.49'W, depth 4197 m.

Dredge off bottom UTC 18/06/16 07:05hrs, lat 51°30.87'N, long 176°03.39'W, depth 3816 m.

Content: 1/6 full, fairly small rock, abundant semiconsolidated sediment, several lava fragments, ranging from vesicular to dense

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1						x			F4	
	Serpulidae	1	x								EtOH	

SO249-DR33

Aleutian Trench. Hangig wall immediately above trench SE facing slope along bend in E-W striking hanging wall

Dredge on bottom UTC 18/06/16 14:43hrs, lat 51°04.38'N, long 175°32.39'W, depth 6790 m.

Dredge off bottom UTC 18/06/16 16:36hrs, lat 51°04.84'N, long 175°31.94'W, depth 6505 m.

Content: 1/4 full, semiconsolidated sediments (mud)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR34

Aleutian Trench. NW slope of the trench

Dredge on bottom UTC 19/06/16 01:43hrs, lat 51°16.85'N, long 174°49.50'W, depth 6079 m.

Dredge off bottom UTC 19/06/16 03:16hrs, lat 51°17.21'N, long 174°49.16'W, depth 5703 m.

Content: 1/4 full

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1	x								EtOH	
	Bryozoa	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR35

Western Cones; N of Attu. Small cone on a NW striking slope. Eastward dipping slope

Dredge on bottom UTC 20/06/16 01:22hrs, lat 52°24.15'N, long 172°11.95'W, depth 3549 m.

Dredge off bottom UTC 20/06/16 02:42hrs, lat 53°23.75'N, long 172°11.79'W, depth 3351 m.

Content: 1/3 full, a few relatively large pieces of igneous rocks (volcanics & plutonics) and solidified sediment, semiconsolidated sediments and a lot mud.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cnidaria	1				x					F4	
	Octocorallia	1								x	EtOH	Several branches, packed in WhirlPak 300 ml
	Cnidaria	1			x						EtOH	
	Octocorallia	2			x						EtOH	
	Brachiopoda	2		x							EtOH	
	Porifera	1		x							EtOH	
	Porifera	3	x								EtOH	
	Brachiopoda	1	x								EtOH	
	Polychaeta	1	x								EtOH	

SO249-DR36

Western Cones; N of Attu. Very small cone on WNW-ESE striking ridge north of DR35 along north dipping slope

Dredge on bottom UTC 20/06/16 05:54hrs, lat 53°24.67'N, long 172°09.59'W, depth 3649 m

Dredge off bottom UTC 20/06/16 06:44hrs, lat 53°24.43'N, long 172°09.29'W, depth 3575 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	1		x							F4	
	Brachiopoda	1		x							F4	
	?	10	x								EtOH	
	Porifera	1	x								F4	
	?	3	x								F4	
	Bryozoa	3	x								EtOH	
	Brachiopoda	2	x								EtOH	
	Porifera	5	x								EtOH	
	Octocorallia	4	x								EtOH	

SO249-DR37

Western Cones; N of Attu. Multiple cones, elongated in NNW-SSE direction. Dredge track along N dipping slope of central large cone from middle section to top

Dredge on bottom UTC 20/06/16 09:56hrs, lat 53°25.82'N, long 172°4.33'W, depth 3643 m

Dredge off bottom UTC 20/06/16 11:20hrs, lat 53°25.48'N, long 172°4.20'W, depth 3339 m

Content: 1/5 full, recovered very fresh pieces of large Hbl bearing pillow lava (sample -1 to -6) without glassy margins.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR38

Western Cones; Lower section of large cone that was dredged during SO201 in the upper part. N facing slope.

Dredge on bottom UTC 20/06/16 14:40hrs, lat 53°29.14'N, long 171°59.57'W, depth 3554 m

Dredge off bottom UTC 20/06/16 16:16hrs, lat 53°29.89'N, long 171°58.84'W, depth 3024 m

Content: Full, mostly angular fragments of dacite lavas. A few rocks of other types: andesites, granite, sediments + ST samples

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Holothuroidea 1/5	1						x			F4	Presumably member of Deimatidae (ID: Mike Reich)
	Octocorallia	1								x	EtOH	Several branches packed in WhirlPak 100 ml
	Holothuroidea 4/5	1	x								AM	Part of large sea cucumber
	Holothuroidea 5/5	1		x							RNA	Part of large sea cucumber
	Brachiopoda 2/4	1	x								PFA	Part of brachiopod
	Brachiopoda 3/4	1	x								AM	Part of brachiopod
	Holothuroidea 3/5	1	x								PFA	Part of large sea cucumber
	Holothuroidea 2/5	1	x								EtOH	Part of large sea cucumber
	Brachiopoda 1/4	1	x								EtOH	Part of brachiopod
	Brachiopoda	1	x								EtOH	
	Brachiopoda 4/4	1		x							RNA	Part of brachiopod
	?	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	Porifera	2	x								EtOH	
	Bryozoa	2	x								EtOH	
	Bryozoa	1		x							EtOH	
	Serpulidae	1	x								EtOH	

SO249-DR39

Kresta Ridge: South facing slope along lower section

Dredge on bottom UTC 20/06/16 20:55hrs, lat 53°16.23'N, long 171°35.70'E, depth 3342 m

Dredge off bottom UTC 20/06/16 22:28hrs, lat 53°16.68'N, long 171°35.80'E, depth 2903 m

Content: 1/4 full, mostly volcanic and sedimentary breccia, tectonites. Some small igneous rocks of volcanic and plutonic provenance.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	3	x								EtOH	
	?	2	x								EtOH	
	Octocorallia	2	x								EtOH	
	Polychaeta	1	x								EtOH	

SO249-DR40

Kresta Ridge. Southern slope at ist base

Dredge on bottom UTC 21/06/16 2:50hrs, lat 53°22.78'N, long 171°13.10'E, depth 3570 m

Dredge off bottom UTC 21/06/16 4:14hrs, lat 53°23.19'N, long 171°13.23'E, depth 3060 m

Content: 1/4 full, angular, freshly broken plutonic rocks. Hbl bearing granodiorite throughout dredge.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Brachiopoda	1	x								EtOH	
	?	2	x								EtOH	
	Cnidaria	1	x								EtOH	
	Bryozoa	1	x								EtOH	

SO249-DR41

Kresta Ridge. Ca 2nm West of DR40. Mid section of south dipping slope below small ridge.

Dredge on bottom UTC 21/06/16 7:44hrs, lat 53°24.32'N, long 171°10.32'W, depth 3311 m

Dredge off bottom UTC 21/06/16 08:55hrs, lat 53°24.69'N, long 171°10.37'W, depth 2815 m

Content: 1/2 full, at first glance the rocks appeared plutonic but after cutting they turned out to be mostly cataclasites.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	
	Octocorallia	1			x						F4	
	Porifera	1			x						F4	
	Polychaeta	1	x								F4	

SO249-DR42

Aleutian trench; hanging wall. Indent into hanging wall, 30nm E of N-S trending part of Stalemate ridge. Upper section of ridge in hanging wall.

Dredge on bottom UTC 21/06/16 19:17hrs, lat 52°39.67'N, long 170°23.99'W, depth 6115 m

Dredge off bottom UTC 21/06/16 20:52hrs, lat 52°40.15'N, long 170°24.12'W, depth 5628 m

Content: 2/3 full, metasedimentary rocks: tuffs, breccias, argilites, some volcanic rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1	x								EtOH	

SO249-DR43

Inner slope of Aleutian Trench W of Attu. 4th step on the inner slope ~20km from trench axis
Dredge on bottom UTC 22/06/16 02:13hrs, lat 52°46.66'N, long 170°20.15'W, depth 5668 m
Dredge off bottom UTC 22/06/16 03:25hrs, lat 52°47.08'N, long 170°20.10'W, depth 5377 m
Content: 1/6 full, semi-consolidated mud containing a single sub-rounded volcanic rock with 2% Hbl phenocrysts.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR44
Aleutian Trench, hanging wall. Second "dent" in hanging wall WNW of DR42-43 area. Steep SSE facing slope from base.
Dredge on bottom UTC 22/06/16 11:03hrs, lat 52°49.79'N, long 169°57.37'W, depth 6670 m
Dredge off bottom UTC 22/06/16 12:50hrs, lat 52°50.25'N, long 169°57.21'W, depth 6209 m
Content: 1/5 full, solidified and semi-consolidated sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR45
Stalemate Fracture Zone. Northernmost part of FZ entering the trench.
Dredge on bottom UTC 22/06/16 20:53hrs, lat 52°39.65'N, long 169°41.52'W, depth 5263 m
Dredge off bottom UTC 22/06/16 22:28hrs, lat 52°39.38'N, long 169°40.81'W, depth 4726 m
Content: 1/2 full

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	2		x							EtOH	
	Octocorallia	1		x							EtOH	
	Bryozoa	1		x							EtOH	
	Porifera	7	x								EtOH	
	Polychaeta	2	x								EtOH	
	Octocorallia	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR46
Stalemate Fracture Zone. Western slope in the deeper part of the fracture zone
Dredge on bottom UTC 23/06/16 03:21hrs, lat 52°42.09'N, long 169°42.96'W, depth 6641 m
Dredge off bottom UTC 23/06/16 06:36hrs, lat 52°42.04'N, long 169°42.96'W, depth 6432 m
Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	1			x						EtOH	Tunicata (?)
	Crustacea	1	x								EtOH	Isopoda?

SO249-DR47
Topregion of MMw-SSE striking Stalemate Ridge. Track across N-S striking fault line along the eastward dipping slope along its entire length
Dredge on bottom UTC 23/06/16 15:31hrs, lat 52°28.95'N, long 169°39.63'W, depth 3429 m
Dredge off bottom UTC 23/06/16 17:01hrs, lat 52°28.88'N, long 169°38.92'W, depth 3050 m
Content: 1/4 full, well solidified conglomerates, sandstones, separate pebbles and subangular fragments of igneous rocks.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	1			x						EtOH	Coral stem + sponge crown + polychaetes?
	Porifera	2	x								EtOH	
	Polychaeta	2	x								EtOH	
	?	2	x								EtOH	

SO249-DR48
Attu Canyons. S end of SW striking ridge, south from Attu Island. South facing slope / scarp
Dredge on bottom UTC 24/06/16 02:12hrs, lat 52°36.32'N, long 171°23.97'W, depth 3815 m
Dredge off bottom UTC 24/06/16 03:22hrs, lat 52°36.27'N, long 171°23.18'W, depth 3493 m
Content: 1/4 full, manly sediments. Two lava fragments Plg-Amph phyric.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR49
Attu Canyons. Entrance of canyon beneath eastern Attu. SE facing slope upper section, across possible NE-SW striking fault
Dredge on bottom UTC 24/06/16 11:37hrs, lat 52°16.92'N, long 172°16.55'W, depth 3716 m
Dredge off bottom UTC 24/06/16 13:04hrs, lat 52°17.35'N, long 172°16.16'W, depth 3307 m
Content: 1/2 full, mostly mud with rounded fragments of semi-consolidated sediment (mudstone) and a fes clasts of porpyric volcanics.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	1			x						EtOH	
	Octocorallia	1			x						EtOH	
	?	1			x						EtOH	
	Porifera	1	x								EtOH	
	Crinoidea	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR50
Attu Canyons. ~8km NE of DR49 along NE dipping slope from bottom to ridge

Dredge on bottom UTC 24/06/16 16:50hrs, lat 52°19.98'N, long 172°22.54'W, depth 3713 m
Dredge off bottom UTC 24/06/16 18:22hrs, lat 52°19.65'N, long 172°22.38'W, depth 3317 m
Content: 1/4 full, mostly semi-consolidated mudstones, sandstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	

SO249-DR51
Aleutian slope SW of Attu. NE shallow slope
Dredge on bottom UTC 25/06/16 01:52hrs, lat 52°15.60'N, long 172°58.20'W, depth 1512 m
Dredge off bottom UTC 25/06/16 03:24hrs, lat 52°15.92'N, long 172°58.62'W, depth 1099 m
Content: 1/4 full, brecciated aphyric lava fragments along with Plg + Amph or Px phyric lavas. Minor diabasic rocks, volcaniclastics and sediments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	1								x	EtOH	Sponge (*Cladorhiza corona*) packed in 2000 ml WhirlPak
	?	1								x	EtOH	Sponge (*Cladorhiza corona*) packed in 700 ml WhirlPak
	Polychaeta	1				x					F4	
	Polychaeta 1/5	1				x					F4	Animal was cut in half and central segments were fixed using other fixatives
	Porifera	1				x					F4	
	?	1				x					F4	
	Porifera	1			x						EtOH	
	Octocorallia	1			x						EtOH	
	Octocorallia	2		x							EtOH	
	Polychaeta	1		x							EtOH	
	Polychaeta 3/5	1		x							RNA	Part of larger sample
	Polychaeta	1	x								EtOH	
	?	2	x								EtOH	
	Porifera	5	x								EtOH	
	Polychaeta 5/5	1	x								EtOH	Part of larger sample
	Polychaeta 2/5	1	x								AM	Part of larger sample
	Polychaeta 4/5	1	x								PFA	Part of larger sample
	Tunicata	1	x								EtOH	
	Bryozoa	2	x								EtOH	
	Actinaria	1	x								EtOH	

SO249-PF52
Profiling, no biological sampling

SO249-DR53
Stalemate Fracture Zone; SE section, ~5nm NNW of SO201-DR7, lower slope
Dredge on bottom UTC 26/06/16 03:34hrs, lat 51°04.73'N, long 173°25.28'W, depth 4095 m
Dredge off bottom UTC 26/06/16 04:57hrs, lat 50°04.64'N, long 173°25.86'W, depth 3708 m
Content: Few rocks, only a few Plg phyric lavas recovered. Plg may be good for Ar-Ar age dating

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR54
Stalemate Fracture Zone; easternmost part of mapped area. NE facing slope of the ridge, ~2.5nm NW of SO201-1b DR7
Dredge on bottom UTC 26/06/16 08:24hrs, lat 50°03.39'N, long 173°30.39'W, depth 3684 m
Dredge off bottom UTC 26/06/16 09:52hrs, lat 50°02.99'N, long 173°29.87'W, depth 3101 m
Content: 1/2 full, mostly aphyric and Plg phyric diabases, one large bloc argillites, few sandstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1					x				F4	Dead warm water coral?

SO249-DR55
Stalemate Fracture Zone; northern flank from base to near ridge crest
Dredge on bottom UTC 26/06/16 15:52hrs, lat 50°28.16'N, long 173°02.02'W, depth 4166 m
Dredge off bottom UTC 26/06/16 17:03hrs, lat 50°27.77'N, long 173°01.86'W, depth 3744 m
Content: 1/6 full, few insitu Plg phyric lavas are good for geochemistry and possible Ar-Ar dating

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Ophiuroidea 1/5	1			x						F4	
	Ophiuroidea 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea 3/5	1	x								PFA	Part of larger sample
	Ophiuroidea 4/5	1	x								AM	Part of larger sample
	Ophiuroidea 5/5	1		x							RNA	Part of larger sample

SO249-DR56
Stalemate Fracture Zone; northern flank, 9nm from DR55
Dredge on bottom UTC 26/06/16 21:47hrs, lat 50°34.45'N, long 173°53.62'W, depth 4147 m
Dredge off bottom UTC 26/06/16 23:12hrs, lat 50°34.03'N, long 172°53.41'W, depth 3656 m
Content: Few rocks, two igneous rocks subangular to rounded. Rest are grey sediments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	
	Bryozoa	1	x								EtOH	
	Porifera	1	x								EtOH	
	Serpulidae	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR57

Stalemate Fracture Zone; northern flank, 8nm from DR56

Dredge on bottom UTC 27/06/16 03:21hrs, lat 50°39.4'N, long 172°44.62'W, depth 4054 m

Dredge off bottom UTC 27/06/16 05:21hrs, lat 50°38.94'N, long 172°44.41'W, depth 3657 m

Content: 1/3 full, two very large fragments of Mn crust. Numerous small rocks, predominantly solidified sediments, some igneous, small pebbles.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cnidaria	1					x				F4	
	? 1/2	1					x				F4	Sponge (like *Cladorhiza* ?)
	Holothuroidea 1/5	1					x				F4	
	Cnidaria 1/2	1				x					F4	
	? 2/2	1			x						EtOH	Sponge (like *Cladorhiza* ?)
	Cnidaria 2/2	1		x							EtOH	Part of larger sample
	Holothuroidea 2/5	1		x							RNA	Part of larger sample
	Holothuroidea 3/5	1	x								PFA	Part of larger sample
	Holothuroidea 4/5	1	x								AM	Part of larger sample
	Holothuroidea 5/5	1	x								EtOH	Part of larger sample
	Nemertea	1	x								EtOH	
	Tunicata	1	x								EtOH	

SO249-DR58

Stalemate Fracture Zone; northern flank, middle part along NE facing slope

Dredge on bottom UTC 27/06/16 10:55hrs, lat 50°53.23'N, long 172°15.89'W, depth 4453 m

Dredge off bottom UTC 27/06/16 12:24hrs, lat 50°52.70'N, long 172°15.97'W, depth 3930 m

Content: 1/2 full, mostly igneous rocks; dolerites / diabases and gabbro.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	?	3	x								EtOH	

SO249-DR59

Stalemate Fracture Zone; middle part, along NE facing slope

Dredge on bottom UTC 27/06/16 17:37hrs, lat 51°01.44'N, long 172°01.33'W, depth 4272 m

Dredge off bottom UTC 27/06/16 19:05hrs, lat 51°01.06'N, long 172°01.02'W, depth 3814 m

Content: 1/3 full, three large blocs of Mn crust , two large igneous boulders that after closer inspection and sawing turned out to be ice rafted material.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Polychaeta	3	x								EtOH	
	Porifera	1	x								EtOH	
	?	1	x								EtOH	
	Bryozoa	1	x								EtOH	

SO249-DR60

Stalemate Fracture Zone; 2nd shallowest ridge of entire FZ. Steep N facing slope from base to mid section

Dredge on bottom UTC 28/06/16 02:57hrs, lat 51°27.76'N, long 171°13.24'W, depth 3836 m

Dredge off bottom UTC 28/06/16 05:05hrs, lat 51°27.34'N, long 171°12.99'W, depth 3230 m

Content: Few rocks, brecciated and hydrothermally altered diabases

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR61

Stalemate Fracture Zone; 2nd shallowest ridge of entire FZ. E of DR60 further upslope beneath ridge crest. Steep N facing slope from mid section to top

Dredge on bottom UTC 28/06/16 08:49hrs, lat 51°23.60'N, long 171°16.35'W, depth 3071 m

Dredge off bottom UTC 28/06/16 10:13hrs, lat 51°27.17'N, long 171°16.10'W, depth 2508 m

Content: 1/2 full, thick Mn crusts with fragments of Ol-Plg phyric basalts (pillow lava).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Cirripedia 1/2	1					x				F4	
	Porifera 1/2	1			x						F4	
	Ophiuroidea 1/5	1			x						F4	
	Ophiuroidea 3/5	1		x							RNA	Part of larger sample
	Ophiuroidea 2/5	1	x								EtOH	Part of larger sample
	Cirripedia 2/2	1	x								EtOH	Part of larger sample
	Porifera 2/2	1	x								EtOH	Part of larger sample
	Ophiuroidea 4/5	1	x								AM	Part of larger sample
	Ophiuroidea 5/5	1	x								PFA	Part of larger sample

SO249-DR62

Emperor Seamount Province. East slope of N-S striking ridge near Stalemate FZ (20 nm south)

Dredge on bottom UTC 28/06/16 17:26hrs, lat 51°18.19'N, long 170°20.61'E, depth 4447 m
Dredge off bottom UTC 28/06/16 18:54hrs, lat 51°17.92'N, long 170°20.09'W, depth 3845 m
Content: 1/5 full, aphyric pillow, pillow fragments and Ol phyric lava fragments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1	x								EtOH	
	Tunicata	1	x								EtOH	Or Actinaria?
	Serpulidae	2	x								EtOH	
	Bryozoa	2	x								EtOH	
	Ostracoda	1	x								EtOH	

SO249-DR63
Emperor Seamount Province. Northeast slope of seamount located southwest of the ridge of DR62
Dredge on bottom UTC 29/06/16 00:53hrs, lat 51°09.45'N, long 169°51.44'E, depth 4441 m
Dredge off bottom UTC 29/06/16 02:35hrs, lat 51°09.01'N, long 169°51.09'W, depth 3946 m
Content: 1/8 full, thick Mn crusts, some rock cobbles, small pieces of igneous rocks with Mn crusts.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1						x			F4	
	Porifera	1			x						F4	
	Serpulidae	1	x								EtOH	

SO249-DR64
Emperor Seamount Province. Small cone on north facing slope of seamount E of Detroit
Dredge on bottom UTC 29/06/16 10:24hrs, lat 51°03.90'N, long 168°47.92'E, depth 2945 m
Dredge off bottom UTC 29/06/16 12:03hrs, lat 51°03.46'N, long 168°47.75'W, depth 2446 m
Content: Few rocks, sample -1 to -5 are lava fragments with variable phenocryst content

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR65
Emperor Seamounts. "Late stage" seamount at the SW margin of Detroit Tablemount
Dredge on bottom UTC 29/06/16 22:54hrs, lat 50°31.96'N, long 167°28.97'E, depth 3313 m
Dredge off bottom UTC 30/06/16 00:25hrs, lat 50°32.39'N, long 167°28.51'W, depth 2897 m
Content: 1/8 full, platy Mn crusts, freshly broken (-6). Very few hard rocks; heterolithological, many rounded.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
	Cnidaria 1/2	1						x				Species of *Atolla* (Atollidae)
	Cnidaria 2/2	1	x									Part of larger sample
	Porifera	1	x									
	?	1	x									

SO249-DR66
Emperor Seamounts. Top region of "Late stage" seamount at the SW margin of Detroit Tablemount.
Dredge on bottom UTC 30/06/16 04:17hrs, lat 50°39.09'N, long 167°21.98'E, depth 2252 m
Dredge off bottom UTC 30/06/16 05:46hrs, lat 50°38.59'N, long 167°21.64'W, depth 1917 m
Content: 1/2 full, heterolithological dredge with abundant rounded rocks.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Ocotocorallia 1/2	1								x	F4	2 l Kautex - Golden coral specimen has six associated ophiuroids. The positions of these animals have been noted (photograph) and EtOH samples of all six were taken (see below)
	Ocotocorallia	1								x	EtOH	2000 ml WhirlPak Golden coral samples
	Octocorallia	1								x	EtOH	700 ml WhirPak Golden coral samples
	Ophiuroidea 1/5	1			x						F4	Specimen had fallen off one of the golden corals
	Ophiuroidea 4/5	1		x							RNA	Part of larger sample
	Octocorallia 2/2	1	x								EtOH	Part of larger sample
	Ophiuroidea 2/5	1	x								EtOH	Part of larger sample
	?	3	x								EtOH	
	Serpulidae	1	x								EtOH	
	Ophiuroidea 3/5	1	x								AM	Part of larger sample
	Ophiuroidea 5/5	1	x								PFA	Part of larger sample
	Ophiuroidea 1	1	x								EtOH	Animal nr. 1 from golden coral in 2 l Kautex
	Ophiuroidea 2	1	x								EtOH	Animal nr. 2 from golden coral in 2 l Kautex
	Ophiuroidea 3	1	x								EtOH	Animal nr. 3 from golden coral in 2 l Kautex
	Ophiuroidea 4	1	x								EtOH	Animal nr. 4 from golden coral in 2 l Kautex
	Ophiuroidea 5	1	x								EtOH	Animal nr. 5 from golden coral in 2 l Kautex
	Ophiuroidea 6	1	x								EtOH	Animal nr. 6 from golden coral in 2 l Kautex

SO249-DR67
Emperor Seamounts at Detroit Seamount. Western edge of the plateau, 2nd step below the plateau edge
Dredge on bottom UTC 30/06/16 11:46hrs, lat 50°33.86'N, long 167°04.34'E, depth 4308 m
Dredge off bottom UTC 30/06/16 12:59hrs, lat 50°34.10'N, long 167°04.98'W, depth 3876 m
Content: Few rocks, insitu sediment (-2) along with green shist facies amphibolite dropstone (-1)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES

Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Holothuroidea 1/2	1						x			F4	
	Cnidaria	1		x							EtOH	Tentacles of a jellyfish?
	Holothuroidea 2/2	1	x								EtOH	Part of larger sample

SO249-DR68

Emperor Seamounts. NE-SW striking ridge at W margin of Hanzei. SE facing slope where ridge connects with Hanzei guyot

Dredge on bottom UTC 30/06/16 21:04hrs, lat 49°59.41'N, long 167°21.72'E, depth 4247 m

Dredge off bottom UTC 30/06/16 22:52hrs, lat 49°59.90'N, long 167°21.34'E, depth 3389 m

Content: Few rocks, Mn crust with volcaniclastic sediment (-1) attached most likely the only insitu volcanic rock of the dredge

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1								x	EtOH	
	Bryozoa	1	x								EtOH	
	Octocorallia	1	x								EtOH	Part of larger sample
	?	3	x								EtOH	

SO249-DR69

Emperor Seamounts. NW facing slope of ridge at the W side of Hanzei, ca 5nm NW of DR68. Uppermost section below accross ridge crest

Dredge on bottom UTC 01/07/16 02:51hrs, lat 50°01.65'N, long 167°12.73'E, depth 3403 m

Dredge off bottom UTC 01/07/16 04:21hrs, lat 50°01.14'N, long 167°13.04'E, depth 3004 m

Content: Few rocks, a few small rock fragments (igneous, sediments). All are likely dropstones, as all are different (granites, dolerites).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR70

Emperor Seamounts; Hanzei. W rim of the plateau. Track across plateau edge.

Dredge on bottom UTC 01/07/16 08:45hrs, lat 50°01.02'N, long 167°30.52'E, depth 3685 m

Dredge off bottom UTC 01/07/16 10:09hrs, lat 50°01.53'N, long 167°30.44'E, depth 3278 m

Content: 1/4 full, thick Fe-Mn crusts, one large basaltic breccia of CPx basalt and several angular to rounded rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR71

Emperor Seamounts; Suizei: Northern margin of the guyot, upper 400m

Dredge on bottom UTC 01/07/16 14:45hrs, lat 49°48.07'N, long 167°47.82'E, depth 2960 m

Dredge off bottom UTC 01/07/16 16:14hrs, lat 49°48.07'N, long 167°47.81'E, depth 2469 m

Content: 1/2 full, several large blocs; most of them granites, gabbros, sediment and shist. Lots of various sediment, all of which were assigned to be ice rafted material.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	1		x							EtOH	
	?	1		x							EtOH	Cephalopod arm? Cirrate?

SO249-DR72

Emperor Seamounts; Suizei: small flat topped, posterosional cone on plateau of Suizei. Track from base to top along southern margin.

Dredge on bottom UTC 01/07/16 20:15hrs, lat 49°44.28'N, long 167°51.37'E, depth 2639 m

Dredge off bottom UTC 01/07/16 21:14hrs, lat 49°44.57'N, long 167°51.19'E, depth 2331 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR73

Emperor Seamounts; Suizei: SW margin beneath plateau edge at steepest section

Dredge on bottom UTC 02/07/16 02:18hrs, lat 49°34.44'N, long 167°48.77'E, depth 3230 m

Dredge off bottom UTC 02/07/16 03:56hrs, lat 49°34.97'N, long 167°48.80'E, depth 2764 m

Content: Very few rocks, hole in chain bag at bottom, only dropstones were collected. These were pebble sized plutonics and sub-angular sediments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	
	?	1		x							EtOH	Polychaete tube?

SO249-DR74

Emperor Seamounts; Suizei: E slope, half way between SO201 DR45 and DR44

Dredge on bottom UTC 02/07/16 10:03hrs, lat 49°37.47'N, long 168°33.47'E, depth 3871 m

Dredge off bottom UTC 02/07/16 11:27hrs, lat 49°37.41'N, long 168°32.59'E, depth 3395 m

Content: 1/4 full, mostly Fe-Mn crust, one large bloc of metaconglomerate, few consolidated sediments, dolerite

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR75

Emperor Seamounts; Suizei: E slope, just S of SO201 DR44, beneath plateau edge

Dredge on bottom UTC 02/07/16 15:39hrs, lat 49°43.93'N, long 168°33.97'E, depth 3378 m

Dredge off bottom UTC 02/07/16 16:54hrs, lat 49°44.24'N, long 168°33.41'E, depth 2960 m

Content: Mud + few rocks, Ol-Plg ± CPx lava fragments with fairly similar petrography inbetween individual pieces.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

Macrofauna	Porifera	1	x								EtOH	
	Polychaeta	1	x								EtOH	

SO249-DR76

Emperor Seamount province; Seamount 70nm E of Hanzei. Cone at northen slope. Track along N facing slope along steepest part

Dredge on bottom UTC 03/07/16 02:43hrs, lat 50°16.92'N, long 169°56.29'E, depth 3341 m

Dredge off bottom UTC 03/07/16 04:23hrs, lat 50°16.41'N, long 169°56.35'E, depth 2822 m

Content: 1/6 full angular basalt fragments, pillow lava fragments, sometimes with fresh glass margins

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Brisingida 1/5	1					x				F4	
	Ophiuroidea 1/5	1			x						F4	
	Cnidaria	1		x							EtOH	Jellyfish tentacles
	Polychaeta	1	x								EtOH	
	Brisingida 2/5	1	x								EtOH	Part of larger sample
	Brisingida 3/5	1	x								AM	Part of larger sample
	Brisingida 4/5	1	x								PFA	Part of larger sample
	Brisingida 5/5	1		x							RNA	Part of larger sample
	Ophiuroidea 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea 3/5	1	x								AM	Part of larger sample
	Ophiuroidea 4/5	1	x								PFA	Part of larger sample
	Ophiuroidea 5/5	1		x							RNA	Part of larger sample

SO249-DR77

Emperor Seamount province; Seamount 70nm E of Hanzei. Lower part of the southern slope

Dredge on bottom UTC 03/07/16 10:25hrs, lat 50°05.76'N, long 169°55.74'E, depth 4136 m

Dredge off bottom UTC 03/07/16 11:52hrs, lat 50°06.20'N, long 169°55.75'E, depth 3680 m

Content: Few rocks, one potentially insitu rock fragment; Px-Plg basalt

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR78

Emperor Seamount province; Seamount 70nm E of Hanzei. Second, smaller volcano in the SE. Track along S facing slope

Dredge on bottom UTC 03/07/16 10:25hrs, lat 48°44.29'N, long 177°30.24'E, depth 3130 m

Dredge off bottom UTC 03/07/16 11:52hrs, lat 48°43.88'N, long 177°30.10'E, depth 2615 m

Content: 1/6 full, four large boulders, most rocks of this dredge are clearly dropstones, very rounded and crystal rich andesites with Fsp and Amph.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	3	x								EtOH	
	Bryozoa	1	x								EtOH	
	Octocorallia	1	x								EtOH	
	Serpulidae	1	x								EtOH	
	?	5	x								EtOH	

SO249-DR79

Tenji Smt.

Dredge on bottom UTC 04/07/16 02:45hrs, lat 49°22.94'N, long 169°51.20'W, depth 4504 m

Dredge off bottom UTC 04/07/16 04:13hrs, lat 49°23.36'N, long 169°51.04'W, depth 4059 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1								x	EtOH	2000 ml WhirlPak

SO249-DR80

Tenji Smt. NE-SW trending ridge, southern slope, lower part

Dredge on bottom UTC 04/07/16 09:28hrs, lat 49°17.79'N, long 169°42.90'W, depth 4701 m

Dredge off bottom UTC 04/07/16 10:52hrs, lat 49°18.19'N, long 169°42.77'W, depth 4174 m

Content: Few rocks, two fragments of pillow lavas from brecia cemented by Mn-Fe hydroxides and clay. One large block of metasediment and several small dropstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	Individual branches, one with Anthozoa
	Bryozoa	1	x								EtOH	

SO249-DR81

Tenji Smt. Upper part of the E slope, ~9nm NNW of SO209-1b_DR2; beneath plateau edge

Dredge on bottom UTC 04/07/16 18:13hrs, lat 48°44.33'N, long 169°15.16'E, depth 3139 m

Dredge off bottom UTC 04/07/16 19:58hrs, lat 48°43.90'N, long 169°14.68'E, depth 2614 m

Content: Corals and few rocks, eight igneous rocks overall

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1								x	EtOH	2000 ml WhirlPak, many branches, some with associated Ophiuroidea
	Octocorallia 1/2	1								x	EtOH	2000 ml WhirlPak, branch with several associated ophiuroids, see photograph
	Octocorallia 2/2	1								x	F4	700 ml WhirlPak, branch with three very large associated Ophiuroidea, part of larger sample

	Ophiuroidea	1					x				F4	Two large brittle stars, had presumably been attached to a coral
	Octocorallia	1			x						EtOH	Single branch of coral
	Ophiuroidea A 1/5	1			x						F4	
	Ophiuroidea A 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea A 3/5	1	x								AM	Part of larger sample
	Ophiuroidea A 4/5	1		x							RNA	Part of larger sample
	Ophiuroidea A 5/5	1	x								PFA	Part of larger sample
	Ophiuroidea B 1/5	1			x						F4	
	Ophiuroidea B 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea B 3/5	1	x								AM	Part of larger sample
	Ophiuroidea B 4/5	1		x							RNA	Part of larger sample
	Ophiuroidea B 5/5	1	x								PFA	Part of larger sample

SO249-DR82

Tenji Smt. Eastern part at N-S striking seamount / ridge. SW facing slope above large circular basin witin Tenji.

Dredge on bottom UTC 05/07/16 02:19hrs, lat 48°27.53'N, long 169°52.21'E, depth 4417 m

Dredge off bottom UTC 05/07/16 04:02hrs, lat 48°27.91'N, long 168°52.69'E, depth 3913 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna										x	F4	In small white drum with red cap. Measurements prior to fixation: Total length: 290 mm, Mantle length: 95 mm, Mantle width: 61 mm, Head width: 69 mm, Fin length: 66 mm, Fin width: 35 mm, Funnel length: 21 mm, Eye diameter: 17 mm, Maximum sucker diameter: 3 mm, Maximum cirrus length: 2 mm. Also see photographs. Most likely *Grimpoteuthis* sp. Compare with *G. bathynectes* & *G. tuftsi* (Tufts Abyssal Plain, 2800-4000 m)
	Cirrata 1/5	1										
	Octocorallia	1								x	EtOH	2000 ml WhirlPak
	Octocorallia	1								x	EtOH	700 ml WhirlPak
	Cirrata 2/5	1	x								EtOH	Part of larger sample
	Cirrata 3/5	1	x								AM	Part of larger sample
	Cirrata 4/5	1	x								PFA	Part of larger sample
	Cirrata 5/5	1		x							RNA	Part of larger sample

SO249-DR83

Tenji Smt. NE-SW striking ridge in the W part of the seamount. Southern slope

Dredge on bottom UTC 05/07/16 12:02hrs, lat 48°24.77'N, long 167°54.15'E, depth 4923 m

Dredge off bottom UTC 05/07/16 13:32hrs, lat 48°24.77'N, long 168°54.51'E, depth 4432 m

Content: One rock, dropstone

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR84

Tenji Smt. W flank, mid section at steepest part

Dredge on bottom UTC 05/07/16 21:18hrs, lat 48°55.04'N, long 168°02.91'E, depth 3903 m

Dredge off bottom UTC 05/07/16 22:38hrs, lat 48°55.02'N, long 168°03.65'E, depth 3499 m

Content: Two platy rock fragments, one 3-5 cm thick Mn crust with mud attached, one ø7cm Mn knoll

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-DR85

Krusenstern Fracture Zone: Southern part SW of Tenji Seamoun. SW facing slope along a small nose from base to top

Dredge on bottom UTC 06/07/16 09:48hrs, lat 48°32.07'N, long 167°09.67'E, depth 6005 m

Dredge off bottom UTC 06/07/16 11:24hrs, lat 48°32.46'N, long 167°10.11'E, depth 5513 m

Content: Two rocks, diorite and sandstone of questionable origin. Most likley dropstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Porifera	3	x								EtOH	
	?	2	x								EtOH	

SO249-DR86

Krusenstern Fracture Zone: SW facing slope along its lower section

Dredge on bottom UTC 06/07/16 22:19hrs, lat 49°17.67'N, long 166°20.18'E, depth 5905 m

Dredge off bottom UTC 06/07/16 23:59hrs, lat 48°18.10'N, long 166°20.52'E, depth 5365 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps

SO249-CTD87

CTD, no biological sampling

SO249-DR88

Krusenstern Fracture Zone: middle part, E of Suizei Seamount, NE facing slope from bottom to top
Dredge on bottom UTC 07/07/16 31:21hrs, lat 49°24.78'N, long 166°16.32'E, depth 5189 m
Dredge off bottom UTC 07/07/16 14:51hrs, lat 49°24.47'N, long 166°16.07'E, depth 4668 m
Content: 1/4 full, a fairly homogeneous dredge of aphyric ocean floor lavas that comprises pillows and pillow fragments along with greenish-yellowish hyaloclastite.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1						x			F6	From sediment traps
Macrofauna	Porifera A 1/2	1					x				F4	
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Octocorallia 1/2	1								x	EtOH	700 ml WhirlPak
	Octocorallia 2/2	1	x								EtOH	Part of larger sample
	Octocorallia	1			x						F4	
	Cnidaria	1				x					EtOH	Anthozoa?
	Porifera B 1/2	1								x	F4	2000 ml WhirlPak
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 1/2	1						x			F4	
	Porifera C 2/2	1	x								EtOH	Part of larger sample

SO249-DR89
Kruzenstern F.Z.; ca. 60 nm NW of DR88. Ridge ca. 8 nm NE of main fault line. NE dipping steep slope, from base to top.
Dredge on bottom UTC 08/07/16 01:56 hrs, lat 50°10.20'N, long 165°38.40'E, depth 5012 m
Dredge off bottom UTC 08/07/16 03:31hrs, lat 50°17.89'N, long 165°37.96'E, depth 4565 m.
Content: Few rocks, several small fragments of OL-Plg phyric pillow basalts (samples -1 to -6). One large block of granite (no sample taken).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps
Macrofauna	Octocorallia	1			x						EtOH	
	Bivalvia	2	x								EtOH	

SO249-DR90
Kruzenstern F.Z.; ridge ca. 8 nm NE of main fault line. NE dipping steep slope, ca 1.5nm NW of DR89, from base to top.
Dredge on bottom UTC 08/07/16 08:54 hrs, lat 50°20.34'N, long 165°38.66'E, depth 5256 m
Dredge off bottom UTC 08/07/16 10:21hrs, lat 50°19.97'N, long 165°38.26'E, depth 4703 m.
Content: Few rocks, a relatively large bloc of rare Ol-phyric basalt (-1), Ol is altered. Ol-Plg phyric basalts with large Plg that appears suitable for dating

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2 l Kautex

SO249-DR91
Ocean cust inbetween Kruzenstern and n.N. F.Z. Oval shaped basin NE of a larger seamount (mapped but not sampled).
Dredge on bottom UTC 09/07/16 01:47hrs, lat 49°54.53'N, long 163°35.26'E, depth 5743 m
Dredge off bottom UTC 09/07/16 03:15hrs, lat 49°54.08'N, long 163°35.09'E, depth 5362 m.
Content: Few dcm sized blocs, a large bloc of fresh Px phyric basalt, angular dropstone (-1). Fe-Mn hydroxide crust only insitu rock.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2 l Kautex
Macrofauna	Porifera 1/2	1						x			F4	
	Porifera 2/2	1	x								EtOH	
	Porifera	1			x						EtOH	
	Porifera	1	x								EtOH	
	Polychaeta	2	x								EtOH	
	Cnidaria	1	x								EtOH	

SO249-DR92
Ocean cust inbetween Kruzenstern and n.N. F.Z. "Gummi Bear" Seamount.
Dredge on bottom UTC 09/07/16 11:06hrs, lat 50°04.03'N, long 163°02.08'E, depth 5043 m
Dredge off bottom UTC 09/07/16 12:14hrs, lat 50°03.71'N, long 163°01.77'E, depth 4674 m.
Content: 1/4 full, pillow lava fragments, few dropstones.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 500 ml Kautex
Macrofauna	Porifera	2					x				EtOH	
	Porifera	2			x						EtOH	

SO249-DR93
"Gummi Bear" Seamount. 7 nm south of DR92 along ENE facing slope in lower section
Dredge on bottom UTC 09/07/16 16:58hrs, lat 49°56.81'N, long 163°04.72'E, depth 5251 m
Dredge off bottom UTC 09/07/16 18:22hrs, lat 49°56.45'N, long 163°04.23'E, depth 4824 m.
Content: 1/4 full, pillow lava and pillow lava fragments, all fairly altered except more coarse grained varieties (core of pillows?).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex
Macrofauna	Porifera A 1/2	1								x	F4	Several large specimens of same species in 10 l white drum with red cap
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Brisingida 1/5	1						x			F4	
	Brisingida 2/5	1	x								EtOH	Part of larger sample
	Brisingida 3/5	1	x								PFA	Part of larger sample
	Brisingida 4/5	1		x							RNA	Part of larger sample
	Brisingida 5/5	1	x								AM	Part of larger sample
	Porifera B 1/2	1								x	F4	Packed in 700 ml WhirlPak
	Porifera B 2/2	1	x								EtOH	Part of larger sample

	Cirripedia	1	x								EtOH	From stem of sponge, see WhirlPak with several stems
	Porifera	1								x	F4	Collection of sponge stems
	Porifera C 1/2	1								x	F4	In 2 l Kautex
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 1/2	1				x					F4	
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Porifera E 1/2	1					x				F4	
	Porifera E 2/2	1	x								EtOH	Part of larger sample
	Porifera F 1/2	1					x				F4	
	Porifera F 2/2	1	x								EtOH	Part of larger sample

SO249-DR94

Ocean floor between Kruzenstern and N.N. Fracture Zone. Southern margin of NW-SE elongated basin steeply dipping north facing slope of the ridge.
Dredge on bottom UTC 10/07/16 3:37hrs, lat 49°21.66'N, long 163°20.93'W, depth 5246 m
Dredge off bottom UTC 10/07/16 05:03hrs, lat 49°21.27'N, long 163°20.53'W, depth 4707 m
Content: Three rocks, the relaively fresh (moderately altered)rare Ol-Px-Plg phyric basalts (diabases). On small pebble - dropstone.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-DR95

Ocean floor between Kruzenstern and N.N. Fracture Zone. E-W trending ridge bordering deep depression at its southern margin
Dredge on bottom UTC 10/07/16 9:50hrs, lat 49°23.08'N, long 163°13.56'W, depth 5720 m
Dredge off bottom UTC 10/07/16 11:11hrs, lat 49°22.74'N, long 163°13.46'W, depth 5183 m
Content: Few rocks, two Mn nodules, one flat plate of granodiorite dropstone(?)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 500 ml Kautex
Macrofauna	Porifera	1	x								EtOH	

SO249-DR96

Ocean floor between Kruzenstern and N.N. Fracture Zone. Depression S of "Gummi Bear" seamount.
Dredge on bottom UTC 10/07/16 16:15hrs, lat 49°30.54'N, long 163°08.20'W, depth 5758 m
Dredge off bottom UTC 10/07/16 17:21hrs, lat 49°30.22'N, long 163°08.18'W, depth 5420 m
Content: Few rocks, rocks with certain insitu origin are Plg phyric lava fragments from a Mn crust

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-DR97

Ocean floor between Kruzenstern and N.N Fracture Zone. Depression S of "Gummi Bear" seamount.
Dredge on bottom UTC 10/07/16 23:06hrs, lat 49°23.64'N, long 163°09.97'W, depth 5008 m
Dredge off bottom UTC 11/07/16 00:32hrs, lat 49°23.26'N, long 163°10.04'W, depth 4425 m
Content: One rock, one Mn crust, only a single Plg-Px phyric lava fragment of unclear origin recovered

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 500 ml Kautex
Macrofauna	Octocorallia	1			x						EtOH	

SO249-DR98

Ocean crust inbetween Kruzenstern Fracture Zone and N.N.Fracture Zone. Southern slope of E-W trending bordering deep basin from south.
Dredge on bottom UTC 11/07/16 05:43hrs, lat 49°19.34'N, long 163°14.68'E, depth 5616 m
Dredge off bottom UTC 11/07/16 06:58hrs, lat 49°19.75'N, long 163°14.69'E, depth 5190 m
Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-DR99

Ocean crust inbetween Kruzenstern Fracture Zone and N.N.Fracture Zone.
Dredge on bottom UTC 11/07/16 11:53hrs, lat 49°37.67'N, long 163°01.92'E, depth 5909 m
Dredge off bottom UTC 11/07/16 14:59hrs, lat 49°38.00'N, long 163°02.24'E, depth 5530 m
Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-DR100

N.N. Fracture Zone. Seamount on the SW side of the F.Z. West facing slope from bottom to near top whee slope flattens.
Dredge on bottom UTC 12/07/16 01:50hrs, lat 48°50.66'N, long 162°46.82'E, depth 5639 m
Dredge off bottom UTC 12/07/16 03:04hrs, lat 48°50.45'N, long 162°47.29'E, depth 5299 m
Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-DR101

N.N. Fracture Zone. NE side below small ridge SW facing slope from bottom to top.
Dredge on bottom UTC 12/07/16 09:37hrs, lat 49°06.44'N, long 162°48.51'E, depth 5737 m
Dredge off bottom UTC 12/07/16 10:52hrs, lat 49°06.75'N, long 162°48.90'E, depth 5380 m
Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES

Meiofauna	Unsorted	1								x	F4	From sediment traps, in 500 ml Kautex

SO249-CTD102
CTD, no biological sampling

SO249-DR103
Komandorsky Block - Small NW-SE trending ridge striking parallel to the Aleutian Arc
Dredge on bottom UTC 18/07/16 10:53hrs, lat 54°36.88'N, long 165°52.24'E, depth 5126 m
Dredge off bottom UTC 18/07/16 12:25hrs, lat 54°37.31'N, long 165°52.29'E, depth 4704 m
Content: 1/6 full, few medium sized boulders, only sedimentary rocks (fine-(mainly) to coarse grained) subanglar sandstones to clay sandstone

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex
Macrofauna	Porifera	1	x								EtOH	
	Serpulidae	1	x								EtOH	
	Serpulidae	1	x								F4	

SO249-DR104
Komandorsky Canyons - Ridge SW of Komandorsky Island. North facing slope at NW end of ridge along lower to mid section
Dredge on bottom UTC 18/07/16 17:19hrs, lat 54°41.92'N, long 165°49.25'E, depth 5383 m
Dredge off bottom UTC 18/07/16 18:51hrs, lat 54°41.53'N, long 165°48.89'E, depth 5014 m
Content: Few rocks, one large and several small fragments of consolidated sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex

SO249-CTD105
CTD, no biological sampling

SO249-DR106
Beringia Margin. Lower slope of south-western canyon.
Dredge on bottom UTC 21/07/16 4:28hrs, lat 60°19.99'N, long 179°33.91'E, depth 2496 m
Dredge off bottom UTC 21/07/16 05:39hrs, lat 60°19.68'N, long 179°34.09'E, depth 2109 m
Content: Full, semiconsolidated sediments of two types: 1- yellowish grey mudstone with numerous worm trails; 2- greyish-blue claystone

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in glass
Macrofauna	Majidae 1/2	1								x	F4	Almost intact crab in 10 l white drum with red cap
	Majidae 2/2	1			x						EtOH	Part of larger sample
	Tunicata A 1/2	1			x						F4	
	Tunicata A 2/2	1	x								EtOH	Part of larger sample
	Tunicata B 1/2	1			x						F4	
	Tunicata B 2/2	1	x								EtOH	Part of larger sample
	Tunicata C 1/2	1			x						F4	
	Tunicata C 2/2	1	x								EtOH	Part of larger sample
	Tunicata D 1/2	1					x				F4	
	Tunicata D 2/2	1	x								EtOH	Part of larger sample
	Tunicata E 1/2	1				x					F4	
	Tunicata E 2/2	1	x								EtOH	Part of larger sample
	Tunicata F 1/2	1				x					F4	
	Tunicata F 2/2	1	x								EtOH	Part of larger sample
	Tunicata G 1/2	1				x					F4	
	Tunicata G 2/2	1	x								EtOH	Part of larger sample
	Cnidaria 1/2	1					x				F4	
	Cnidaria 2/2	1	x								EtOH	Part of larger sample
	Porifera A 1/2	1				x					F4	All conserved ponge samples represent about 10% of the sponges dredged up during this dredge
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 1/2	1				x					F4	
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 1/2	1					x				F4	
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 1/2	1				x					F4	
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Porifera E 1/2	1				x					F4	
	Porifera E 2/2	1	x								EtOH	Part of larger sample
	Gastropoda	1								x	Dry	In 50 ml WP
	Bivalvia	2								x	Dry	In 50 ml WP
	Bivalvia	1			x						EtOH	
	Porifera	2			x						EtOH	
	?	1			x						EtOH	
	Isopoda	1			x						EtOH	
	Crustacea	1			x						EtOH	
	Galatheidae	1			x						EtOH	
	Asteroidea	1			x						EtOH	
	Octocorallia	1			x						EtOH	
	Sipuncula	3	x								EtOH	

	Polychaeta	6	x								EtOH	
	Polyplacophora	1	x								EtOH	
	Cnidaria	2	x								EtOH	

SO249-DR107

Beringia Margin SE corner of work area. ~10nm further NW of DR106. S facing wall at northern end of valley. Lower slope of south-western canyon.

Dredge on bottom UTC 21/07/16 09:56hrs, lat 60°28.98'N, long 179°25.61'E, depth 2316 m

Dredge off bottom UTC 21/07/16 11:06hrs, lat 60°29.31'N, long 179°25.74'E, depth 2003 m

Content: 1/5 full, some semi-consolidated clay sediments with abundant worm tubes and holes

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in glass
Macrofauna	Cnidaria 1/2	1								x	F4	In 10 l white drum with red cap
	Cnidaria 2/2	1	x								EtOH	Part of larger sample
	Mollusca 1/2	1								x	F4	In 10 l white drum with red cap - or maybe Holothuroidea?
	Mollusca 2/2	1	x								EtOH	Part of larger sample
	Ophiuroidea	1	x								EtOH	
	Crustacea	1			x						EtOH	
	Ophiuroidea	2			x						EtOH	
	Porifera	1			x						EtOH	
	Cnidaria	1			x						EtOH	
	Polychaeta	1			x						EtOH	
	Isopoda	1		x							EtOH	
	Bivalvia	1		x							EtOH	
	Cnidaria	1		x							EtOH	
	Porifera	1	x								EtOH	
	Asteroidea	1					x				F4	
	Porifera A 1/2	1					x				F4	All conserved ponge samples represent about 10% of the sponges dredged up during this dredge
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 1/2	1					x				F4	
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 1/2	1					x				F4	
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 1/2	1			x						F4	
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Porifera E 1/2	1					x				F4	
	Porifera E 2/2	1	x								EtOH	Part of larger sample
	Porifera F 1/2	1				x					F4	
	Porifera F 2/2	1	x								EtOH	Part of larger sample
	Porifera G 1/2	1				x					F4	
	Porifera G 2/2	1	x								EtOH	Part of larger sample
	Porifera H 1/2	1				x					F4	
	Porifera H 2/2	1	x								EtOH	Part of larger sample
	Porifera I 1/2	1					x				F4	
	Porifera I 2/2	1	x								EtOH	Part of larger sample
	Octocorallia A 1/2	1								x	EtOH	In 2000 ml WP
	Octocorallia A 2/2	1	x								EtOH	Part of larger sample
	Octocorallia B 1/2	1								x	EtOH	In 700 ml WP
	Octocorallia B 2/2	1	x								EtOH	Part of larger sample
	Octocorallia	1								x	EtOH	In 700 ml WP

SO249-DR108

Beringia Margin: upper end of valley W of DR107. ENE sriking valley; track along SSE dipping slope from bottom to top

Dredge on bottom UTC 21/07/16 16:19hrs, lat 60°35.87'N, long 179°04.90'E, depth 2197 m

Dredge off bottom UTC 21/07/16 17:28hrs, lat 60°36.20'N, long 179°04.83'E, depth 1729 m

Content: 1/4 full, soft sediment, three dropstones and lots of semi-consolidated mud with worm tubes.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1								x	F6	From sediment traps, in 2000 ml Kautex
Macrofauna	Octocorallia	2								x	EtOH	In 700 ml WP
	Brisingida	1			x						EtOH	
	Cnidaria	1			x						EtOH	
	Crinoidea	1			x						EtOH	
	Octocorallia 1/2	1								x	F4	In 10 l white drum with red cap
	Octocorallia 2/2	1			x						EtOH	Part of larger sample
	Polychaeta	1		x							EtOH	Sample taken from large coral in 10 l white drum - Spintheridae
	Porifera A 1/2	1					x				F4	
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 1/2	1					x				F4	
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Cnidaria	3	x								EtOH	
	Polychaeta	4	x								EtOH	

SO249-DR109

Chukotka-Beringia Margin at SW end of work area. Young fault (tilted bloc?) off SW end of Chukotka margin. SW facing scarp from bottom to top.
Dredge on bottom UTC 23/07/16 04:55hrs, lat 60°08.85'N, long 171°28.84'E, depth 2720 m
Dredge off bottom UTC 23/07/16 06:29hrs, lat 60°09.16'N, long 171°29.19'E, depth 2099 m
Content: Few rocks, predominantly well solidified silty clay. One large fragment of conglomerate.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Majidae	1								x	F4	Single large crab (two broken went over board)
	Tunicata 1/2	1				x					F4	
	Tunicata 2/2	1	x								EtOH	Part of larger sample
	Porifera A 1/2	1					x				F4	
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 1/2	1					x				F4	
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 1/2	1					x				F4	
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 1/2	1						x			F4	
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Brachiopoda	1	x								F4	
	Gastropoda	1		x							F4	
	Brachiopoda 1/4	1	x								EtOH	
	Brachiopoda 2/4	1	x								AM	
	Brachiopoda 3/4	1		x							RNA	
	Brachiopoda	1	x								PFA	
	Octocorallia	1			x						EtOH	
	Holothuroidea	1		x							EtOH	
	Polychaeta	2	x								EtOH	
	Cnidaria	3	x								EtOH	
	Bryozoa	2	x								EtOH	
	?	5	x								EtOH	
	Gastropoda	2	x								EtOH	
	Tunicata	1	x								EtOH	

SO249-DR110
Chukotka Margin. Fault system SE of Olyutorskiy peninsula, SW facing slope at a fault scarp
Dredge on bottom UTC 24/07/16 02:44hrs, lat 60°03.11'N, long 171°17.77'E, depth 2411 m
Dredge off bottom UTC 24/07/16 03:53hrs, lat 60°03.05'N, long 171°18.50'E, depth 1941 m
Content: 1/2 full, solidified sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Ophiuroidea	1					x				F4	
	Ophiuroidea	1			x						F4	
	Brachiopoda	1			x						F4	
	Brachiopoda 1/5	1			x						F4	
	Brachiopoda	1		x							F4	
	Ophiuroidea A 1/5	1			x						F4	
	Ophiuroidea B 1/5	1			x						F4	
	Octocorallia	1								x	EtOH	In 2000 ml WP
	Bivalvia	1								x	Dry	In 30 ml WP
	Asteroidea 1/5	1								x	F4	In 700 ml WP
	?	4	x								EtOH	
	Polychaeta	2		x							EtOH	
	Hirudinea	1		x							EtOH	
	Majidae	1			x						EtOH	
	Asteroidea	1			x						EtOH	
	Tunicata	1			x						EtOH	
	Bivalvia	1		x							EtOH	
	Brachiopoda	3		x							EtOH	
	Crustacea	1			x						EtOH	
	Polychaeta	8	x								EtOH	
	Brachiopoda	3	x								EtOH	
	Brachiopoda	2		x							EtOH	
	Porifera	1		x							EtOH	
	Nemertea	1	x								EtOH	
	Cnidaria	4	x								EtOH	
	Echiura	1	x								EtOH	
	Porifera	2	x								EtOH	
	Bryozoa	3	x								EtOH	
	Tunicata	1	x								EtOH	
	Majidae	1	x								EtOH	Juvenile!
	Asteroidea	1								x	F4	Large sample in 10 white drum with red cap

SO249-DR111
Chukotka Margin. SW-NE trending canyon S of Olyutorskiy Peninsula, N facing slope
Dredge on bottom UTC 24/07/16 09:19hrs, lat 59°40.67'N, long 170°43.56'E, depth 2721 m
Dredge off bottom UTC 24/07/16 11:13hrs, lat 59°40.23'N, long 170°43.66'E, depth 1194 m
Content: 1/2 full, abundant semi solidified sediments with worm / bivalve burrows. One large sub m-sized bloc of the sediment with borrows.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Asteroidea 1/2	1								x	F4	In 10 l white drum with red cap
	Majidae A 1/2	1								x	F4	In 10 l white drum with red cap
	Majidae B 1/2	1								x	F4	In 10 l white drum with red cap
	Octocorallia 1/2	1								x	F4	In 10 l white drum with red cap
	Octocorallia 2/2	1					x				EtOH	Part of larger sample
	Asteroidea 2/2	1	x								EtOH	Part of larger sample
	Majidae A 2/2	1			x						EtOH	Part of larger sample
	Majidae B 2/2	1			x						EtOH	Part of larger sample
	Bivalvia	1								x	Dry	In 100 ml WP
	Ophiuroidea	1			x						EtOH	
	Anthozoa	1			x						EtOH	
	Tunicata	1			x						EtOH	
	Sipuncula	1		x							EtOH	
	Asteroidea	1								x	EtOH	In 100 ml WP
	Polychaeta	10	x								EtOH	
	Bivalvia	1	x								EtOH	
	Porifera	3	x								EtOH	
	Ophiuroidea	3	x								EtOH	
	Cnidaria	3	x								EtOH	
	Gastropoda	3	x								EtOH	
	Brachiopoda	2	x								EtOH	
	Caprellidae	1	x								EtOH	
	Sipuncula	1				x					F4	
	Tunicata	1				x					F4	
	Porifera	1				x					F4	
	Anthozoa	1				x					F4	
	Octocorallia	1				x					F4	
	Bivalvia	2				x					F4	
	Polychaeta	1				x					F4	
	Brachiopoda	1				x					F4	
	Enteropneusta	1		x							F4	
	Bivalvia	1		x							F4	
	Octocorallia	1	x								F4	
	Porifera	2	x								F4	
	Caprellidae	1	x								F4	
	Cnidaria	6	x								F4	
	?	5	x								F4	
	Polyplacophora	1	x								F4	
	Bryozoa	1	x								F4	
	Hydrozoa	1	x								F4	
	Brachiopoda	1	x								F4	
	Amphipoda	1	x								F4	

SO249-DR112

Shirshov Ridge Western Margin. Oval shaped ridge along NE facing slope.

Dredge on bottom UTC 24/07/16 16:49hrs, lat 58°47.12'N, long 178°00.21'E, depth 1909 m

Dredge off bottom UTC 24/07/16 18:06hrs, lat 58°47.07'N, long 169°59.38'E, depth 1447 m

Content: 1/2 full, predominantly ultramafic rocks - harzburgites, pyroxenites and dunites with highly variable proportions of Ol and Opx.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Octocorallia	1								x	EtOH	In 700 ml WP
	Porifera	1								x	EtOH	In 700 ml WP
	Tunicata	2			x						EtOH	
	?	1			x						EtOH	
	Majidae	1			x						EtOH	Broken rest of specimen went over board
	Octocorallia 1/2	1							x		F4	In 10 l white drum
	Octocorallia 2/2	1			x						EtOH	Part of larger sample
	Brachiopoda	1	x								EtOH	
	Polychaeta	3	x								EtOH	
	Tunicata	1	x								EtOH	
	?	2	x								EtOH	

SO249-DR113

Shirshov Ridge (western slope). Third "core-complex" from north, base SE facing slope

Dredge on bottom UTC 25/07/16 01:21hrs, lat 58°21.65'N, long 169°43.02'E, depth 2721 m

Dredge off bottom UTC 25/07/16 02:51hrs, lat 58°22.01'N, long 169°43.71'E, depth 2291 m

Content: 1/4 full, semiconsolidated sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Majidae	1								x	F4	In 10 l white drum with red cap (in WP bag)
	Actinia 1/2	1								x	F4	In 10 l white drum with red cap
	Octocorallia	1			x						F4	
	Sipuncula	1			x						F4	
	Brachiopoda	1		x							F4	

	Gastropoda	1		x							F4	
	Polychaeta	3		x							F4	
	Enteropneusta 1/2	1		x							F4	
	Tunicata	2			x						EtOH	
	Cnidaria	1			x						EtOH	
	Sipuncula	1			x						EtOH	
	Porifera	1			x						EtOH	
	?	1			x						EtOH	
	Octocorallia	1								x	EtOH	In 700 ml WP
	Gastropoda	1		x							EtOH	
	Brachiopoda	1		x							EtOH	
	Ophiuroidea	1		x							EtOH	
	Actinia 2/2	1	x								EtOH	
	Enteropneusta 2/2	1	x								EtOH	
	Cnidaria	1	x								EtOH	
	Polychaeta	5	x								EtOH	
	?	1	x								EtOH	
	Porifera	2	x								EtOH	
	Polyplacophora	1	x								EtOH	
	Brachiopoda	2	x								EtOH	
	Sipuncula	1	x								EtOH	

SO249-DR114

Shirshov Ridge, western slope. Southernmost "core complex" along its northern slope

Dredge on bottom UTC 25/07/16 06:31hrs, lat 58°15.38'N, long 169°39.12'E, depth 2739 m

Dredge off bottom UTC 25/07/16 08:13hrs, lat 58°14.95'N, long 169°38.72'E, depth 2262 m

Content: Full, all rocks are relatively uniform parashists. Single pebble of granodorite and single angular meta-andesite

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Cnidaria	2		x							EtOH	
	Brachiopoda	1		x							EtOH	
	Tunicata	1		x							EtOH	
	?	1		x							EtOH	
	?	5	x								EtOH	
	Serpulidae	1	x								EtOH	
	Bryozoa	1	x								EtOH	
	Cnidaria	1	x								EtOH	
	Bivalvia	1	x								EtOH	
	Brachiopoda	3	x								EtOH	
	Porifera	1	x								EtOH	
	Polychaeta	5	x								EtOH	
	Tunicata	1	x								EtOH	
	Gastropoda	1	x								EtOH	

SO249-DR115

Shirshov Ridge, central western flank. N-S trending ridge at ~N termination. Eastern flank along E-W striking valley along N facing slope thereof

Dredge on bottom UTC 25/07/16 16:03hrs, lat 57°41.36'N, long 169°08.92'E, depth 2921 m

Dredge off bottom UTC 25/07/16 17:21hrs, lat 57°40.95'N, long 169°08.91'E, depth 2557 m

Content: 1/5 full, lots of mud and three possible dropstones. Two are dacitic tuffs.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Gastropoda	1	x								EtOH	
	Bivalvia	1	x								EtOH	

SO249-CTD116

CTD, no biological sampling

SO249-DR117

Beta Fracture Zone. Westernmost basement high, ~10km long, NW-SE elongated ridge, small canyon at its N end

Dredge on bottom UTC 26/07/16 10:18hrs, lat 57°32.58'N, long 169°21.45'E, depth 2984 m

Dredge off bottom UTC 25/07/16 17:21hrs, lat 57°40.95'N, long 169°08.91'E, depth 2557 m

Content: 1/6 full, mostly mud with lots of biology (very large worms), two rounded dropstones, one subangular bloc of sediment rock

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Porifera 1/2	1					x				F4	
	Sipuncula	1			x						F4	
	Sipuncula	1		x							F4	
	Ophiuroidea	1			x						F4	
	Incirrata 1/5	1			x						F4	Eggs, s. photograph
	Incirrata 2/5	1			x						EtOH	
	Incirrata 3/5	1	x								AM	
	Incirrata 4/5	1		x							RNA	
	Incirrata 5/5	1	x								PFA	
	Sipuncula	1			x						EtOH	
	Polychaeta	1			x						EtOH	
	Assorted	1			x						EtOH	

	Ophiuroidea	1			x						EtOH	
	Crinoidea	1		x							EtOH	
	Crustacea	1		x							EtOH	
	?	4	x								EtOH	
	Porifera	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	Sipuncula	1	x								EtOH	

SO249-DR118

Beta Rise, Beta Fracture Zone. NE slope of small NW-SE striking ridge.

Dredge on bottom UTC 27/07/16 22:37hrs, lat 56°40.46'N, long 166°06.36'E, depth 3591 m

Dredge off bottom UTC 27/07/16 23:55hrs, lat 56°39.99'N, long 166°06.06'E, depth 3273 m

Content: Few rocks, blocks of sediment. One large block of granite, mudstones.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Anthozoa	1			x						F4	
	Porifera A 1/2	1				x					F4	
	Porifera B 1/2	1					x				F4	
	Pycnogonida	1								x	F4	In 10 l white drum with red cap
	Pycnogonida	1			x						EtOH	Both specimens with associated amphipod
	Anthozoa	1			x						EtOH	
	Porifera	1			x						EtOH	
	Bryozoa	1	x								EtOH	
	Polychaeta	1		x							EtOH	
	Porifera A 2/2	1	x								EtOH	
	Porifera B 2/2	1	x								EtOH	
	Porifera	2								x	EtOH	In 700 ml WP

SO249-DR119

Beta Rise, Beta Fracture Zone. Isolated seamount ~40km from southeasternmost Smt of the Beta FZ working area

Dredge on bottom UTC 27/07/16 06:46hrs, lat 57°02.47'N, long 165°40.94'E, depth 3457 m

Dredge off bottom UTC 27/07/16 08:09hrs, lat 57°02.75'N, long 166°40.23'E, depth 3189 m

Content: 1/4 full, mostly semi-consolidated sediments, numerous pebbles and fragments of metamorphic rock and sedimentary rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Porifera 1/2	1			x						F4	
	Ophiuroidea 1/2	1		x							F4	
	Polychaeta	1		x							F4	
	Anthozoa	1			x						EtOH	
	Ophiuroidea	1			x						EtOH	
	Polychaeta	1		x							EtOH	
	Porifera 2/2	1	x								EtOH	
	Ophiuroidea 2/2	1	x								EtOH	
	Polychaeta	5	x								EtOH	
	Porifera	3	x								EtOH	
	Bryozoa	1	x								EtOH	
	Ophiuroidea 1/5	1			x						F4	
	Ophiuroidea 2/5	1	x								EtOH	
	Ophiuroidea 3/5	1	x								AM	
	Ophiuroidea 4/5	1		x							RNA	
	Ophiuroidea 5/5	1	x								PFA	

SO249-DR120

Alpha fracture zone: Northwestern termination of Allpha F.Z. near western boundary of working area. NNE dipping slope from bottom to top.

Dredge on bottom UTC 27/07/16 17:45hrs, lat 57°11.59'N, long 164°04.27'E, depth 2713 m

Dredge off bottom UTC 27/07/16 19:42hrs, lat 57°11.09'N, long 164°04.07'E, depth 2367 m

Content: 2/3 full, mud; dropstones; some sediment blocks and Mn nodules.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Majidae	1								x	F4	In 10 l white drum with red cap
	Octopoda	1								x	F4	In 5 l white drum with red cap
	Asteroidea 1/2	2								x	F4	In 10 l white drum with red cap
	Octopoda A 1/2	1								x	F4	In 5 l white drum with red cap
	Tunicata	1				x					EtOH	
	Tunicata	1			x						EtOH	
	Cnidaria	1			x						EtOH	
	Octopoda A 2/2	1			x						EtOH	
	Asteroidea 2/2	1	x								EtOH	
	Octopoda B 2/2	1	x								EtOH	Eggs
	Octopoda B 1/2	1	x								F4	Eggs

SO249-DR121

Alpha fracture zone: Small step in ocean floor ca. 8 nm south of the westernmost section of Alpha F.Z.

Dredge on bottom UTC 27/07/16 00:18hrs, lat 57°4.22'N, long 164°02.36'E, depth 3264 m

Dredge off bottom UTC 27/07/16 01:27hrs, lat 57°4.62'N, long 164°02.50'E, depth 3000 m

Content: Mud

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Polychaeta	1			x						F4	
	Holothuroidea 1/2	1								x	F4	IN 5 l drum with red cap - *Scotoplanes*
	Ophiuroidea	1			x						EtOH	
	Polychaeta	2		x							EtOH	
	Polychaeta	1	x								EtOH	
	Crinoidea	1	x								EtOH	
	Holothuroidea 2/2	1	x								EtOH	Part of larger sample

SO249-DR122

Beta Rise, Alpha F.Z.: westernmost part of Alpha F.Z., SW facing slope of the fracture zone.

Dredge on bottom UTC 28/07/16 05:04hrs, lat 57°4.85'N, long 164°19.24'E, depth 2750 m

Dredge off bottom UTC 28/07/16 06:10hrs, lat 57°05.24'N, long 164°19.45'E, depth 2440 m

Content: 1/4 full, semiconsolidated sediments with abundant wood fragments.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Cnidaria 1/2	1					x				F4	
	Polychaeta	1			x						F4	
	Cnidaria 2/2	1			x						EtOH	
	Tunicata	1			x						EtOH	
	Holothuroidea 1/2	2								x	F4	In 10 l white drum with red cap
	Holothuroidea 2/2	1	x								EtOH	Part of larger sample
	Porifera	2	x								EtOH	
	Polychaeta	10	x								EtOH	
	Bryozoa	1	x								EtOH	

SO249-DR123

Alpha F.Z.: soth-west facing slope from bottom to top

Dredge on bottom UTC 28/07/16 15:34hrs, lat 56°2.10'N, long 166°34.44'E, depth 3798 m

Dredge off bottom UTC 28/07/16 18:26hrs, lat 56°2.63'N, long 166°34.62'E, depth 3287 m

Content: Few rocks, small dropstones, one sample of possible in-situ origin - tuff or aphyric basalt.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Cnidaria 1/2	1					x				F4	
	Cnidaria 2/2	1	x								EtOH	Part of larger sample

SO249-DR124

Volcanologists Massif: Tilted block (?) north-west of the western flank the massif, northeastern flank of the seamount.

Dredge on bottom UTC 29/07/16 00:26hrs, lat 55°41.83'N, long 167°07.59'E, depth 3879 m

Dredge off bottom UTC 29/07/16 01:39hrs, lat 57°41.33'N, long 167°07.00'E, depth 3460 m

Content: 1/4 full, pillow lava fragments; few dropstones.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Porifera A 1/2	1								x	F4	In 10 l white drum with red cap
	Porifera B 1/2	1								x	F4	In 10 l white drum with red cap
	Porifera C 1/2	1								x	F4	In 10 l white drum with red cap
	Porifera D 1/2	1								x	F4	In 10 l white drum with red cap
	Porifera E 1/2	1			x						F4	
	Porifera F 1/2	1			x						F4	
	Cnidaria 1/2	1			x						F4	
	Tunicata	1			x						EtOH	
	Ophiuroidea	1			x						EtOH	
	Porifera	1								x	EtOH	In 100 ml WP
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Porifera E 2/2	1	x								EtOH	Part of larger sample
	Porifera F 2/2	1	x								EtOH	Part of larger sample
	Cnidaria 2/2	1	x								EtOH	Part of larger sample
	Crustacea	2	x								EtOH	
	Polychaeta	1	x								EtOH	
	Porifera	1	x								EtOH	
	Gastropoda	1	x								EtOH	
	Bryozoa	1	x								EtOH	
	Ophiuroidea	1	x								EtOH	
	?	1	x								EtOH	

SO249-DR125

Alpha Fracture Zone: The deepest part of F.Z. facing to Kommandor Graben

Dredge on bottom UTC 29/07/16 5:51hrs, lat 55°47.86'N, long 167°21.52'E, depth 4215 m

Dredge off bottom UTC 27/07/16 07:15hrs, lat 55°48.30'N, long 167°21.65'E, depth 3668 m

Content: A few rocks, volcanoclastic breccia, chirty silt, subvolcanic and intrusive rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle

Macrofauna	Bryozoa	2			x						EtOH	
	Bryozoa	2	x								EtOH	
	Polychaeta	6	x								EtOH	
	?	5	x								EtOH	
	Porifera	3	x								EtOH	
	Cnidaria	1	x								EtOH	
	Sipuncula	1	x								EtOH	

SO249-DR126

Volcanologists massif, NE of Piip, NNE-SSW trenchng ridge NE of Piip. WNW slope from middle section to top

Dredge on bottom UTC 29/07/16 13:29hrs, lat 55°27.34'N, long 167°30.23'E, depth 2954 m

Dredge off bottom UTC 27/07/16 15:02hrs, lat 55°27.02'N, long 167°30.46'E, depth 2384 m

Content: 3/4 full, mostly lava fragments, angular, some dropstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Octocorallia	1			x						EtOH	
	Porifera	1			x						EtOH	
	Bryozoa	2	x								EtOH	
	Polychaeta	2	x								EtOH	
	?	8	x								EtOH	
	Porifera	3	x								EtOH	
	Octocorallia	1	x								EtOH	
	Cnidaria	1	x								EtOH	
	Ophiuroidea	1	x								EtOH	
	Tunicata	2	x								EtOH	

SO249-DR127

Volcanologists massif, East flank, near crest of the ridge

Dredge on bottom UTC 29/07/16 17:59hrs, lat 55°20.19'N, long 167°28.42'E, depth 2548 m

Dredge off bottom UTC 29/07/16 19:12hrs, lat 55°20.57'N, long 167°28.29'E, depth 2158 m

Content: 1/2 full, pillow fragments up to 0.5 m ø, hyaloclastites, dropstones, mud

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol bottle
Macrofauna	Octocorallia	1		x							EtOH	
	Polychaeta	3	x								EtOH	
	Crustacea	1	x								EtOH	
	Cirripedia	1								x	EtOH	In 100 ml WP

SO249-DR128

Piip Volcano - top area, upper northern slope of northern cone, along lava flow (?)

Dredge on bottom UTC 30/07/16 00:05hrs, lat 55°25.34'N, long 167°16.40'E, depth 670 m

Dredge off bottom UTC 30/07/16 00:56hrs, lat 55°25.08'N, long 167°16.45'E, depth 460 m

Content: Full, massive and porous (dacites) / andesites several blocks upto 1 m in diametr, numerous small fragments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Cnidaria 1/2	1					x				F4	
	Porifera A 1/2	1					x				F4	
	Porifera B 1/2	1				x					F4	
	Porifera C 1/2	1					x				F4	
	Cnidaria	1			x						EtOH	
	Porifera C 2/2	1			x						EtOH	
	Octocorallia	1								x	EtOH	In 300 ml WP
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Cnidaria 2/2	1	x								EtOH	Part of larger sample
	Porifera	4	x								EtOH	
	?	12	x								EtOH	Mostly Tunicata?
	Bryozoa	3	x								EtOH	
	Cnidaria	5	x								EtOH	
	Polychaeta	1	x								EtOH	
	Bivalvia	1	x								EtOH	
	Octocorallia 1/2	1								x	F4	In 10 l white drum with red cap
	Octocorallia 2/2	1	x								EtOH	Part of larger sample

SO249-DR129

Piip Volcano - top area, upper south western slope of central cone

Dredge on bottom UTC 30/07/16 01:46hrs, lat 55°23.72'N, long 167°16.30'E, depth 878 m

Dredge off bottom UTC 30/07/16 02:55hrs, lat 55°23.98'N, long 167°16.12'E, depth 642 m

Content: Full, lots of small rock fragments in mud ~dacite massive pumicw - small pieces

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Polychaeta	2		x							F4	
	Holothuroidea	1						x			F4	
	Porifera B 1/2	1				x					F4	
	Tunicata 1/2	1				x					F4	
	Crustacea	1			x						F4	

	Ophiuroidea	1			x						F4	
	Polychaeta	1			x						F4	
	Cnidaria 1/2	1				x					F4	
	Brachiopoda 1/5	1	x								F4	
	Brachiopoda 2/5	1	x								EtOH	
	Brachiopoda 3/5	1	x								AM	
	Brachiopoda 4/5	1		x							RNA	
	Brachiopoda 5/5	1	x								PFA	
	Ophiuroidea 1/5	1	x								F4	
	Ophiuroidea 2/5	1	x								EtOH	
	Ophiuroidea 3/5	1	x								AM	
	Ophiuroidea 4/5	1		x							RNA	
	Ophiuroidea 5/5	1	x								PFA	
	Bivalvia	1			x						EtOH	
	Brachiopoda	1			x						EtOH	
	Crustacea	2			x						EtOH	
	Cnidaria 2/2	1			x						EtOH	Part of larger sample
	Holothuroidea	1			x						EtOH	
	Polychaeta	1		x							EtOH	
	Porifera A 1/2	1								x	F4	In 10 l white drum with red cap
	Tunicata 2/2	1	x								EtOH	Part of larger sample
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Polychaeta	8	x								EtOH	
	Bryozoa	3	x								EtOH	
	Crustacea	1	x								EtOH	
	Nemertea	2	x								EtOH	
	Porifera	1	x								EtOH	
	Ophiuroidea	1	x								EtOH	
	Bivalvia	1	x								EtOH	
	Octocorallia	1								x	F4	In 5 l white drum with red cap (+ associated Polychaeta and Crustacea)

SO249-DR130

Piip Volcano - top area, rift emanating from central cone to the west, upper southern slope

Dredge on bottom UTC 30/07/16 04:20hrs, lat 55°23.72'N, long 167°14.17'E, depth 1129 m

Dredge off bottom UTC 30/07/16 05:09hrs, lat 55°23.95'N, long 167°14.33'E, depth 904 m

Content: Full, white pumice, corals, some dropstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol
Macrofauna	Asteroidea 1/2	1								x	F4	In 5l white drum with red cap
	Porifera A 1/2	1				x					F4	
	Porifera B 1/2	1				x					F4	
	Porifera C 1/2	1				x					F4	
	Porifera D 1/2	1			x						F4	
	Polychaeta	1			x						F4	
	Crustacea	1	x								F4	
	Polychaeta	1	x								F4	
	Tunicata	1			x						EtOH	
	Crustacea	1			x						EtOH	
	Ophiuroidea	1			x						EtOH	
	Asteroidea 2/2	1	x								EtOH	Part of larger sample
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 2/2	1	x								EtOH	Part of larger sample
	Porifera C 2/2	1	x								EtOH	Part of larger sample
	Porifera D 2/2	1	x								EtOH	Part of larger sample
	Polychaeta	8	x								EtOH	
	Porifera	3	x								EtOH	
	Majidae	1	x								EtOH	
	Bryozoa	2	x								EtOH	
	Ophiuroidea	2	x								EtOH	
	Cnidaria	1	x								EtOH	
	Bivalvia	1	x								EtOH	
	Crustacea	1	x								EtOH	

SO249-DR131

Piip volcano - top area, upper northeastern slope of southern cone

Dredge on bottom UTC 30/07/16 06:30hrs, lat 55°23.06'N, long 167°16.27'E, depth 712 m

Dredge off bottom UTC 30/07/16 07:16hrs, lat 55°22.89'N, long 167°15.94'E, depth 537 m

Content: Full, several large solid rocks, lots of pumice, dropstones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Porifera A 1/2	1				x					F4	
	Holothuroidea	1					x				F4	
	Polyplacophora 1/2	1			x						F4	
	Porifera B 1/2	1			x						F4	
	Crustacea	1			x						F4	

	Sipuncula	2	x								F4	
	?	1	x								F4	
	Crustacea	1			x						EtOH	
	Holothuroidea	1			x						EtOH	
	Majidae 2/2	1			x						EtOH	
	Octocorallia	1								x	EtOH	In 100 ml WP
	Polychaeta	1		x							EtOH	
	Porifera A 2/2	1	x								EtOH	
	Porifera B 2/2	1	x								EtOH	
	Polyplacophora 2/2	1	x								EtOH	
	Bryozoa	6	x								EtOH	
	Polychaeta	3	x								EtOH	
	?	3	x								EtOH	
	Cnidaria	2	x								EtOH	
	Ophiuroidea	1	x								EtOH	
	Sipuncula	1	x								EtOH	
	Crustacea	1	x								EtOH	
	Majidae 1/2	1								x	F4	In 5 l drum with red cap

SO249-DR132

Volcanologist Massif - Southern slope of small cone located on the edge of the steep southern flank of Volcanologist Massif (S. of Piip)

Dredge on bottom UTC 30/07/16 10:37hrs, lat 55°17.04'N, long 167°18.03'E, depth 3036 m

Dredge off bottom UTC 30/07/16 11:51hrs, lat 55°17.39'N, long 167°17.98'E, depth 2607 m

Content: 1/5 full, pillow lavas (+ few drop-stones). Highly vesiculated pillow lavas with many glassy margins

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol

SO249-DR133

Volcanologists Massif. Southern edge of the basement

Dredge on bottom UTC 30/07/16 15:07hrs, lat 55°15.18'N, long 167°20.12'E, depth 3782 m

Dredge off bottom UTC 30/07/16 16:40hrs, lat 55°15.45'N, long 167°20.81'E, depth 3271 m

Content: Full, numerous fragments of pillow lavas, collumnar lavas, hyaloclastites.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Ex-Alcohol
Macrofauna	Brachiopoda	1			x						EtOH	
	?	3	x								EtOH	
	Polychaeta	2	x								EtOH	
	Bryozoa	7	x								EtOH	
	Porifera	3	x								EtOH	
	Octocorallia	1	x								EtOH	

SO249-DR134

Komandorsky Block - south eastern tip of the base of Medny Island, upper NE-facing slope

Dredge on bottom UTC 131/07/16 09:39hrs, lat 54°20.86'N, long 168°41.208'E, depth 1645 m

Dredge off bottom UTC 13/07/16 10:42hrs, lat 54°20.58'N, long 168°40.99'E, depth 1220 m

Content: 1/2 full, volcanic rocks, mostly subrounded, larger and smaller blocks; aphyric to Pl-phyric andesites, some andesitic breccia.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Octocorallia	1								x	EtOH	In 100 ml WP
	Cnidaria	1			x						EtOH	
	Bryozoa	8	x								EtOH	
	?	1	x								EtOH	

SO249-DR135

Guyot SE of Medny Island, N-facing slope

Dredge on bottom UTC 13/07/16 12:42hrs, lat 54°16.99'N, long 168°44.73'E, depth 882 m

Dredge off bottom UTC 13/07/16 14:10hrs, lat 54°16.55'N, long 168°44.58'E, depth 344 m

Content: Full, heterolithological rock fragments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Crustacea	1					x				F4	
	Bryozoa	1					x				F4	
	Porifera A 1/2	1				x					F4	
	Porifera B 1/2	1			x						F4	
	Porifera C 1/2	1				x					F4	
	Porifera	1				x					F4	
	Tunicata 1/2	1				x					F4	
	Porifera	1								x	EtOH	In 100 ml WP
	Octocorallia	1								x	DRY	In 100 ml WP
	Crustacea	1			x						EtOH	
	Bryozoa	1		x							EtOH	
	Porifera	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	Tunicata 2/2	1	x								EtOH	
	Porifera A 2/2	1	x								EtOH	
	Porifera B 2/2	1	x								EtOH	

	Porifera C 2/2	1	x								EtOH	

SO249-DR136

Komandorsky Block, central section of slope, SE of Berin Is., base of upper unit

Dredge on bottom UTC 31/07/16 21:49hrs, lat 54°20.71'N, long 16647.73'E, depth 3866 m

Dredge off bottom UTC 31/07/16 23:29hrs, lat 54°21.22'N, long 166°47.69'E, depth 3350 m

Content: 1/4 full, sediments of two types: 1 -breccia (coarse grained and finegrained), 2- unsolidified clay-stone.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Octocorallia	1				x					EtOH	
	Cirripedia	1	x								EtOH	

SO249-DR137

Komandorsky Block, southern slope of Bering Island

Dredge on bottom UTC 01/08/16 04:13hrs, lat 54°08.12'N, long 167°5.97'E, depth 3998 m

Dredge off bottom UTC 01/08/16 05:31hrs, lat 54°08.25'N, long 167°06.27'E, depth 3591 m

Content: Few rocks, sediments

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware

SO249-DR138

Komandorsky Block, southern slope of Kom. Block, steep scarp at the SW tip of basement nose

Dredge on bottom UTC 01/08/16 10:40hrs, lat 54°22.49'N, long 167°03.68'E, depth 1390 m

Dredge off bottom UTC 01/08/16 11:51hrs, lat 54°22.71'N, long 167°04.13'E, depth 1052 m

Content: 1/3 full, sediments (silt, sandstone-breccia) and volcanic rocks (Cpx-rphyric, aphyric and Opx-Hbl-Pl andesite, diorite)

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Porifera	1			x						F4	
	Bryozoa	1		x							F4	
	Porifera	1				x					EtOH	
	?	1		x							EtOH	
	Polychaeta	1		x							EtOH	
	Porifera	2		x							EtOH	
	Crinoidea	1		x							EtOH	
	Porifera	3	x								EtOH	
	Tunicata	2	x								EtOH	
	?	1	x								EtOH	
	Cnidaria	1	x								EtOH	
	Polychaeta	1	x								EtOH	
	Bryozoa	1	x								EtOH	
	Ophiuroidea	1	x								EtOH	

SO249-DR139

Komandorsky Block, eastern slope of the Kom. Block, eastern slope of the basement nose dredge at DR138 on western side lower section up to plateau edge

Dredge on bottom UTC 01/08/16 13:39hrs, lat 54°25.62'N, long 167°08.99'E, depth 920 m

Dredge off bottom UTC 01/08/16 15:04hrs, lat 54°26.07'N, long 167°08.74'E, depth 424 m

Content: Full to the top, heterological dredge of sediments including volcanoclastic material.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Chondrichthyes	1								x	EtOH	In 300 ml WP
	Porifera	2								x	EtOH	In 300 ml WP
	Crustacea	1				x					EtOH	
	Porifera	3								x	EtOH	In 100 ml WP
	Crustacea	2	x								EtOH	
	Cnidaria	1	x								EtOH	
	Ophiuroidea	1	x								EtOH	
	Porifera	1	x								EtOH	

SO249-DR140

Bathymetric height SE of piip volcano, bathymetric height ~30cm SE of the edge of volcanologists massif, NW facing slope

Dredge on bottom UTC 02/08/16 05:43hrs, lat 55°13.14'N, long 168°02.'15E, depth 3719 m

Dredge off bottom UTC 02/08/16 06:46hrs, lat 55°12.87'N, long 168°02.50'E, depth 3508 m

Content: Few rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Polychaeta	5	x								EtOH	
	Bryozoa	2	x								EtOH	
	Porifera	10	x								EtOH	
	?	1	x								EtOH	

SO249-DR141

Bathymetric height SE of Piip Volcano, small ridge ~8km SE from the edge of the volcanologists massif, SE facing slope

Dredge on bottom UTC 02/08/16 10:56hrs, lat 55°15.28'N, long 167°43.'95E, depth 3832 m

Dredge off bottom UTC 02/08/16 12:04hrs, lat 55°15.64'N, long 167°44.50'E, depth 3597 m

Content: Empty, except very small pieces of sediment (solidified mudstone) and sandy dropstone, ø of all rocks <5cm

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES

Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Polychaeta	1			x						EtOH	
	Porifera	1								x	EtOH	In 100 ml WP

SO249-DR142

Volcanologist massif, cone ~10nm NE of Piip volcano, SW-flank from bottom to top

Dredge on bottom UTC 02/08/16 16:52hrs, lat 55°31.68'N, long 167°27.'12E, depth 3737 m

Dredge off bottom UTC 02/08/16 17:53hrs, lat 55°31.83'N, long 167°27,55'E, depth 3565 m

Content: Almost empty, two small fragments, 1x lava top freshly broken off ground, 1x sediment

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Porifera A 1/2	1								x	F4	In 5 l white drum with red cap
	Porifera B 1/2	1								x	F4	In 5 l white drum with red cap
	Porifera	1			x						EtOH	
	Polychaeta	2	x								EtOH	
	Porifera A 2/2	1	x								EtOH	Part of larger sample
	Porifera B 2/2	1	x								EtOH	Part of larger sample

SO249-DR143

Volcanologist massif - cone at NE base of Piip volcano, E facing slope from botton to top

Dredge on bottom UTC 02/08/16 21:14hrs, lat 55°27.86'N, long 167°24.99'E, depth 3271 m

Dredge off bottom UTC 02/08/16 22:00hrs, lat 55°28.10'N, long 167°24.79'E, depth 3116 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware

SO249-DR144

Volcanologists Massif - cone on NE slope of Piip volcano NE facing slope

Dredge on bottom UTC 03/08/16 01:13hrs, lat 55°26.62'N, long 167°20.02'E, depth 2360 m

Dredge off bottom UTC 03/08/16 02:12hrs, lat 55°26.53'N, long 167°19.97'E, depth 2020 m

Content: Full, several up to 1 m ø blocs

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Brachiopoda	1								x	EtOH	In 100 ml WP
	Bryozoa	8	x								EtOH	
	Polychaeta	7	x								EtOH	
	Porifera	8	x								EtOH	
	?	8	x								EtOH	
	Cnidaria	2	x								EtOH	
	Brachiopoda	1	x								EtOH	

SO249-DR145

Volcanologists massif - cone on SE slope of Piip volcano. Steep SE facing slope of the cone

Dredge on bottom UTC 03/08/16 05:36hrs, lat 55°19.27'N, long 167°20.39'E, depth 2592 m

Dredge off bottom UTC 03/08/16 06:29hrs, lat 55°19.63'N, long 167°20.30'E, depth 2251 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Majidae 1/2	1								x	F4	In 5 l white drum with red cap
	Majidae 2/2	1	x								EtOH	Part of larger sample

SO249-DR146

Volcanologists massif - scarp in southern base

Dredge on bottom UTC 03/08/16 09:48hrs, lat 55°15.02'N, long 167°15.40'E, depth 3934 m

Dredge off bottom UTC 03/08/16 11:12hrs, lat 55°15.45'N, long 167°15.32'E, depth 3454 m

Content: Few rocks, pillow lava

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Tunicata	1		x							EtOH	
	Tunicata	2	x								EtOH	
	?	3	x								EtOH	
	Porifera	2	x								EtOH	
	Sipuncula	1	x								EtOH	
	Bryozoa	1	x								EtOH	

SO249-DR147

Komandorsky Block. South of Piip volcano: North facing slope ~400 m above valley floor. Between Piip and Komandorsky Block

Dredge on bottom UTC 03/08/16 14:30hrs, lat 55°13.52'N, long 167°9.95'E, depth 2940 m

Dredge off bottom UTC 03/08/16 15:53hrs, lat 55°13.08'N, long 167°9.96'E, depth 2476 m

Content: 1/3 full, plutonic rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Brachiopoda	1			x						EtOH	
	Majidae	1	x								EtOH	Part of right gill
	Clitellata	1	x								EtOH	Taken from dorsal carapace of Majidae
	Polychaeta	1	x								EtOH	

SO249-DR148

Komandorsky Block South of Piip volcano. North facing slope lowermost section

Dredge on bottom UTC 03/08/16 17:51hrs, lat 55°16.13`N, long 167°3.92'E, depth 3508 m

Dredge off bottom UTC 03/08/16 20:43hrs, lat 55°13.64'N, long 167°3.85'E, depth 3091 m

Content: 1/3 full, plutonic rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 500 ml Kautex
Macrofauna	Cnidaria	1			x						EtOH	
	Polychaeta	4	x								EtOH	
	Crustacea	2	x								EtOH	
	Bryozoa	3	x								EtOH	
	?	3	x								EtOH	

SO249-DR149

Komandorsky Block - Bering fault; South facing slope; lower part, in the middle part of pull-apart basin

Dredge on bottom UTC 04/08/16 13:26hrs, lat 56°00.70'N, long 165°01.38'E, depth 4672 m

Dredge off bottom UTC 04/08/16 14:43hrs, lat 56°01.10'N, long 165°01.53'E, depth 4176 m

Content: 1/8 full, sediments, fairly homogenious silty-clayish rocks, large block contain fossils, or traces of fossils (worms?).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Anthozoa 1/2	1								x	F4	In 5 l white drum with red cap
	Cnidaria 1/2	1					x				F4	
	Anthozoa 2/2	1	x								EtOH	Part of larger sample
	Cnidaria 2/2	1	x								EtOH	Part of larger sample
	Tunicata	1	x								EtOH	

SO249-DR150

Komandorsky Canyons - Pull apart basin along WNW striking fault. Southern margin at base of NNE dipping slope

Dredge on bottom UTC 04/08/16 18:44hrs, lat 55°56.22'N, long 165°03.85'E, depth 4447 m

Dredge off bottom UTC 04/08/16 20:04hrs, lat 55°55.79'N, long 165°03.65'E, depth 4030 m

Content: 1/2 full, alevrolites with sandy layers. Few drop-stones

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Porifera	1								x	EtOH	In 100 ml WP
	Anthozoa 1/2	1					x				F4	
	Porifera 1/2	1								x	F4	In 5 l white drum with red cap
	Anthozoa 2/2	1	x								EtOH	Part of larger sample
	Porifera 2/2	1	x								EtOH	Part of larger sample
	Polychaeta	7	x								EtOH	
	Bryozoa	1	x								EtOH	
	?	2	x								EtOH	
	Porifera	5	x								EtOH	
	Tunicata	2	x								EtOH	
	Brachiopoda	1	x								EtOH	

SO249-DR151

Komandorsky Block - Bering fault, north-east facing slope

Dredge on bottom UTC 05/08/16 01:36hrs, lat 55°49.60'N, long 165°26.73'E, depth 3520 m

Dredge off bottom UTC 05/08/16 02:59hrs, lat 55°49.15'N, long 165°26.69'E, depth 3171 m

Content: Few rocks, soft sediments; a few small rock fragments - drop stones.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 2000 ml Kautex
Macrofauna	Polychaeta	2		x							EtOH	
	Sipuncula	1		x							EtOH	

SO249-DR152

Komandorsky Block - Northern slope of the Komandorsky Block ~70 km to north-west from the northern tip of Bering Island; lower part of the block slope

Dredge on bottom UTC 05/08/16 08:22hrs, lat 55°38.76'N, long 165°42.03'E, depth 3386 m

Dredge off bottom UTC 05/08/16 09:46hrs, lat 55°38.39'N, long 165°41.99'E, depth 2947 m

Content: 1/3 full, heterolithological dredge.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 1000 ml Kautex
Macrofauna	Anthozoa	1				x					EtOH	
	Cnidaria	1			x						EtOH	
	Porifera	5	x								EtOH	
	?	6	x								EtOH	
	Bryozoa	4	x								EtOH	
	Anthozoa	1	x								EtOH	
	Polychaeta	3	x								EtOH	

SO249-DR153

Komandorsky Block - Western termination of Northwestern- Southeastern striking slope of DR152

Dredge on bottom UTC 05/08/16 15:02hrs, lat 55°38.31'N, long 165°00.70'E, depth 2160 m

Dredge off bottom UTC 05/08/16 16:35hrs, lat 55°37.95'N, long 165°01.39'E, depth 1630 m

Content: 3/4 full, heterolithological, mostly volcanics. Most of rocks have rounded shape and represent diverse petrographic types.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware
Macrofauna	Majidae 1/2	1								x	F4	In 5 l white drum with red cap
	Sipuncula	1	x								F4	
	Clitellata	1	x								F4	
	Caprellidae	2	x								F4	
	Porifera	1				x					EtOH	In 100 ml WP
	Bryozoa	1		x							EtOH	
	Majidae 2/2	1	x								EtOH	Part of larger sample
	Ophiuroidea	3	x								EtOH	
	Sipuncula	2	x								EtOH	
	Caprellidae	3	x								EtOH	
	Polychaeta	5	x								EtOH	
	Crustacea	1	x								EtOH	
	Octocorallia	1	x								EtOH	
	Bivalvia	1	x								EtOH	
	Mollusca	1	x								EtOH	
	Ophiuroidea A 1/5	1				x					F4	
	Ophiuroidea A 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea A 3/5	1	x								AM	Part of larger sample
	Ophiuroidea A 4/5	1		x							RNA	Part of larger sample
	Ophiuroidea A 5/5	1	x								PFA	Part of larger sample
	Ophiuroidea B 1/5	1				x					F4	
	Ophiuroidea B 2/5	1	x								EtOH	Part of larger sample
	Ophiuroidea B 3/5	1	x								AM	Part of larger sample
	Ophiuroidea B 4/5	1		x							RNA	Part of larger sample
	Ophiuroidea B 5/5	1	x								PFA	Part of larger sample

SO249-DR154

Komandorsky Block - SW slope of Bering Island

Dredge on bottom UTC 05/08/16 23:39hrs, lat 55°20.86'N, long 165°0.70'E, depth 4715 m

Dredge off bottom UTC 06/08/16 01:07hrs, lat 55°21.29'N, long 165°0.95'E, depth 4289 m

Content: No rocks

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in kitchen glassware

SO249-DR155

Komandorsky Block - Wetern tip of the block, its SW facing slope, middle part

Dredge on bottom UTC 06/08/16 05:27hrs, lat 55°31.13'N, long 164°53.28'E, depth 1939 m

Dredge off bottom UTC 06/08/16 07:36hrs, lat 55°31.24'N, long 164°53.35'E, depth 1400 m

Content: 1/2 full, mainly volcanoclastics (breccia, tuffs) and loose fragments of aphyric to strongly Ol-CPx-Pl-phyric basalts.

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in Ex-Alcohol bottle
Macrofauna	Crustacea	1	x								EtOH	
	Tunicata	1	x								EtOH	
	Polychaeta	2	x								EtOH	
	Porifera	1	x								EtOH	
	?	1	x								EtOH	
	Actinopterygii	1								x	F4	In 10 l white drum with red cap - Macrouridae (*Coryphaenoides* ?)

SO249-DR156

Komandorsky Block - Western tip; SW facing slope, lower part

Dredge on bottom UTC 06/08/16 11:35 hrs, lat 55°31.56'N, long 164°51.33'E, depth 2423 m

Dredge off bottom UTC 06/08/16 12:34 hrs, lat 55°31.55'N, long 164°51.33'E, depth 2450 m

Content: 1/2 full, two main types of rocks: Pl-phyric to aphyric basalts (samples -1 to -6) and volcanogenic breccia (Samples - 7 to 11).

	TAXA	n	2	5	50	100	200	500	1000	other	FIX	NOTES
Meiofauna	Unsorted	1							x		F6	From sediment traps, in 2000 ml Kautex
Macrofauna	Polychaeta	1	x								F4	
	Bryozoa	2		x							EtOH	
	Octocorallia	1		x							EtOH	
	?	6	x								EtOH	
	Polychaeta	11	x								EtOH	
	Caprellidae	1	x								EtOH	
	Octocorallia	2	x								EtOH	
	Bryozoa	2	x								EtOH	

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1	FS POSEIDON Fahrtbericht / Cruise Report POS421, 08. – 18.11.2011, Kiel - Las Palmas, Ed.: T.J. Müller, 26 pp, DOI: 10.3289/GEOMAR_REP_NS_1_2012
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